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THE END-RESULTS OF SINUS SURGERY IN CHILDREN

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The end-results of sinus surgery in children compare favorably with those obtained in adults. The initial improvement is generally gratifying, but the attainment of permanent relief is difficult, for the disease tends to be progressive and may be based on an inherited weakness. Radical surgery on the paranasal sinuses of children is seldom necessary, and, when instituted, requires protracted postoperative care the same as radical mastoid surgery on the growing ear. In both instances the radical element is overcome by the further growth of the sinus or the mastoid process. In the past we have been taught to believe that any surgical interference would stop the growth and the development of the external nose and the paranasal sinuses. This, I believe, is an error. Disease will arrest the development of the sinuses, but, by reestablishing the normal ventilation and drainage of the undeveloped sinuses, through surgery, they will begin to grow again and in many instances regain the lost development. In fact it has been my experience that the sinuses must show new growth before the pathology can be considered corrected. No damage to growth and development of teeth has been found to follow intranasal drainage of the antrums, but the time has been too short to determine its influence later in life on the teeth.

The majority of the cases included in this series originated in the practice of the pediatrician and were referred for relief of symptoms not relative to the sinuses. All are private patients and as such are better for comparison than clinic cases. The average age was 3, the youngest being a girl, aged 16 months, with an anaphylaxis as manifested by asthma and dermatitis. There were forty-five operative cases in this series, and of this number the tonsils and adenoids had been removed in thirty-five, while of the remaining ten, seven had their tonsils and adenoids removed at the time of their sinus operation. Mitchell [1] tabulated the interval between the date of the removal of the tonsils and

1. Mitchell, E. C.: The Paranasal Sinus as a Focus of Infection in Children, Read Before the Southern Medical Association, New Orleans, 1924.

adenoids and the onset of the symptoms of sinus diseases, as may be seen in Table 1.

Are the sinuses more liable to succumb to infection after the tonsils and the adenoids had been removed? After considering Table 1, one would be apt to surmise that the removal of the tonsils and adenoids did make the sinuses more liable to infection, but if the history of these patients is studied closely, one will discover that the child had the symptoms of sinus disease before the tonsils and adenoids were removed. Undoubtedly, the simple removal of the tonsils and adenoids will correct most of the sinusitis of childhood, and my experience has taught me always to include it in the treatment of these patients.

Drainage of the antrum is the most common operation in sinus surgery as applied to children and infants. The reason for this is that the antrum in children has the largest absorbing surface of any of the sinuses and the surgery on these cavities is one of drainage and ventilation. With these principles in mind, a successful antrotomy must comprise methods designed toward continuous drainage and ventilation. The reparative processes of a sinus wall are so rapid in the young that an opening of proportionate size will close before sufficient drainage can be accomplished to eradicate the pathologic changes. To facilitate this continuous drainage, at the time of operation a rubber catheter is inserted into the maxillary sinus through a window made in the naso-antral wall. This tube can be left in place until the discharge has ceased to be purulent; during insertion, it serves as an avenue for irrigation of the sinuses. When the antrum is flushed, the ethmoids are aided by the suction action of the water as it pours out through the ostium and down the hiatus semilunaris.

TABLE 1.—*Patients in Whom Tonsils Had Been Removed Previously*

Under 6 months	3
From 6 months to 1 year	3
From 1 to 2 years	14
From 2 to 3 years	30
From 3 to 4 years	17
From 4 to 5 years	20
From 5 to 6 years	10
From 6 to 7 years	4
From 7 to 8 years	1
From 8 to 9 years	2
From 9 to 10 years	2
Not removed	27
Found necessary to remove prior to sinus operation	14

ANESTHESIA

If the child's condition warrants, ether is the best anesthetic, because the operative procedures can be deliberate and thorough. In those with kidney trouble, either a nitrous oxid or an ethylene mixture is safer than ether.

OPERATION

The nares are cleansed by suction and the site of operation painted with a 30 per cent. alcohol solution. In order to obtain a culture from the antrum, the procedure of Dean is followed: the sinus is punctured with the straight trocar and the antrum is filled with sterile water by inserting a sterile needle on a syringe through the trocar. The child can be kept in a dorsal position with the head extended, as the shape of the antrum will allow it to be filled in this position without overflowing through the ostium. The solution is then withdrawn into the syringe and transferred into test tubes for the laboratory. An antrum trocar knife is inserted under the inferior turbinate, and the nasal wall of the

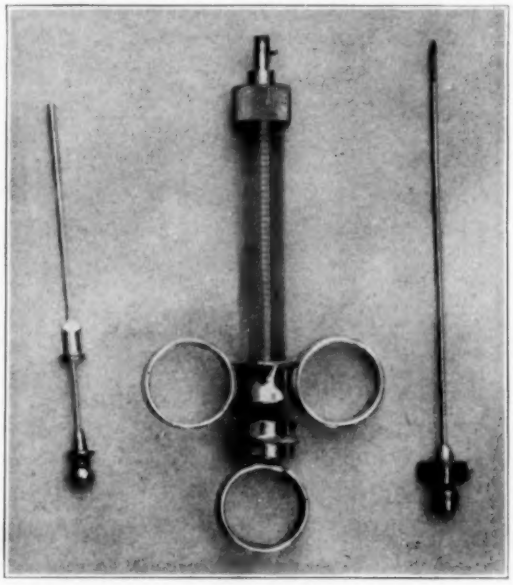

Fig. 1.—Instruments for obtaining antral culture.

antrum is pierced in such a manner that the point of the knife will be directed upward and outward. This reduces the possibility of any damage to the external wall of the antrum, and the height of the sinus is sufficient to insure against injury to the floor of the orbit. It is important to resect the window as far posteriorly as possible, as this insures a more permanent opening which can be accomplished by having the back of the blade serrated and using it as a saw. With a rasp the anterior end of the window is sufficiently enlarged to allow the insertion of a rubber catheter. The catheter is introduced into the antrum over a trocar; when it is in place the trocar is slipped out leaving the tube protruding from the window into the vestibule of the nose. The tube

is then trimmed to fit into the ventricle of the vestibule, which will prevent it from being lost.

POSTOPERATIVE TREATMENT

The tube is kept open by preventing the blood and discharge from solidifying in its aperture. A 10 per cent. solution of protargin mild is instilled through the tube into the antrum three times a day for the first five days, and if the discharge is profuse a little suction is applied through the tube. The tube is removed on the fifth or sixth day; by this time the window is well formed and the subsequent irrigations are made with a straight needle or a curved trocar. Irrigation through the tube is painless, which greatly helps to win the confidence of the children and paves the way for later treatments. If the discharge is profuse or the ethmoids extensively involved, the antrums are thoroughly irrigated;

TABLE 2.—*Chief Complaints for Which Operations Were Performed*

	Cured	Improved	Unimproved
Recurrent laryngitis and bronchitis (cough)	2	5	...
Nephritis, acute glomerulo	4	4	1
Pyelitis	2	5	...
Fever (acute pansinusitis)	...	2	1
Headache	...	...	1
Myocarditis, acute	1	1	...
Dermatitis	...	...	1
Hypertrophy of pharyngeal and lingual lymphoid tissue	...	1	...
Neurotic children	4	...	...
Ozena	...	2	...
Diabetes (pansinusitis)	...	1	...
Otitis media (chronic purulent)	1	...	...
Mastoiditis, acute purulent	...	5	...
Arthritis, acute	1	...	...
Arthritis, chronic	...	1	...
Cyclic vomiting	2	...	...
Asthma	...	6	1
Orbital abscess, acute	1	...	...

the return of the solution through the ostium and down the hiatus semilunaris flushes the ethmoidal cells. The irrigations are continued until the discharge has ceased and are reestablished any time drainage is impeded or if the opening has closed. If the disposition of the child is such as to prevent manipulation under local anesthesia, a little gas can be given for the repuncturing of the sinus. These children must be watched for a long time and on the return of any symptom the antrum should be irrigated. In fact, it is advisable to irrigate these antrums at the end of any acute infection of the nose, remembering that it is not the amount of sinus discharge but the lack of drainage with absorption of the discharge that will poison the child.

ACUTE LARYNGITIS AND BRONCHITIS

The constant clearing of the throat by a child is due to a continual dripping of discharge from the sinuses into the pharynx, and if this discharge is allowed to continue or if it becomes excessive the lower

respiratory tract will be infected. The majority of these children are relieved by the removal of the tonsils and adenoids, with local treatment of the upper respiratory tract. The minority will not be relieved and in spite of vigorous nasal treatment will continue to have recurrent attacks of laryngitis and bronchitis. Drainage and irrigation of the antrums will deplete the ethmoids and stop the postnasal discharge. If these children contract an acute infection, no time should be lost in instituting nasal treatment (such as suction) and tamponing the naris with a protargin mild solution.

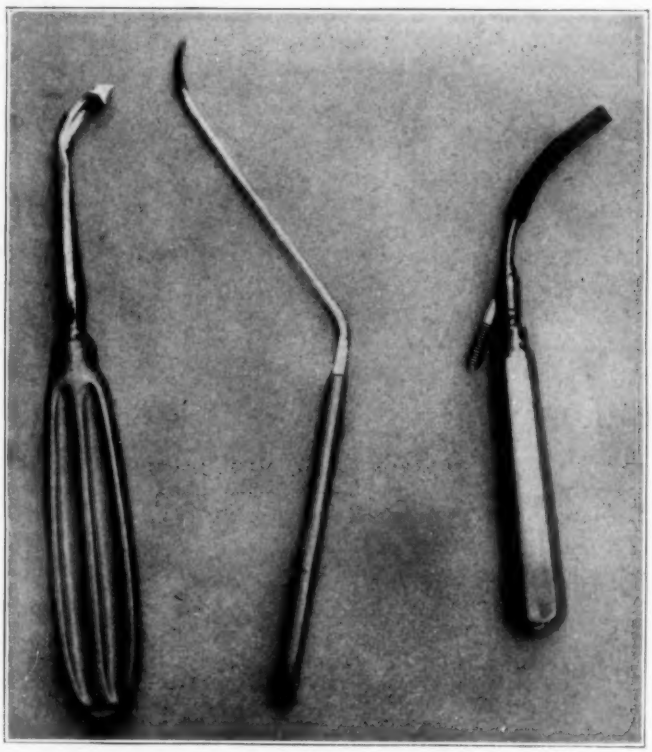

Fig. 2.—Instruments for antrotomy. Arbuckle's trocar knife; Dean's rasp; Coakley trocar, carrying the drainage tube.

NEPHRITIS

Acute glomerulonephritis is caused by some severe toxin. It is an inflammation of the functioning element of the kidney. In this series of cases, the children had been thoroughly examined and the only focus of infection located was the sinuses. Under gas anesthesia, a window was resected into the nasal wall of the antrums and a tube inserted for drainage. The four patients reported as "cured" recovered rapidly. Those listed as "improved" required from two weeks to one month before the

urine could be considered normal. A girl, aged 10, had an acute attack of myocarditis associated with the nephritis and the day following the drainage suffered a suppression with acute blindness. Dr. E. C. Ellett reported the absence of any change in the nerve head and the presence of albuminuric retinitis. The patient marked "unimproved" did show some initial improvement, but as soon as the irrigations of the antrums were discontinued, albumin and casts reappeared in the urine. Apparently the production of the nephritis is a physiochemical reaction, the result of some unknown substance absorbed by the lining of the sinuses. The cultures were staphylococcus in all the patients who had nephritis complicated by edema. The children with edema lose weight rapidly, following the irrigation and drainage from the tissues giving up their excessive fluid contents.

PYELITIS

Pyelitis is rapidly being appreciated by the clinician as a cause of fever in children. The removal of the tonsils and adenoids may be all that is necessary for the cure of pyelitis, because, of the two patients reported as "cured," the tonsils and adenoids were removed at the time the sinuses were drained in one case, while the other child had her tonsils and adenoids removed the year before. The five patients marked "improved" had a favorable initial improvement but with subsequent colds they have had a slight recurrence of pus in the urine.

MYOCARDITIS

The pediatrician now contends that myocarditis is a common form of carditis in children, and that many of the cases with murmurs that in the past have been considered endocarditis because of the murmur are really myocardial. One of the two cases reported is the same girl mentioned in the foregoing, under nephritis, who developed the albuminuric retinitis. In the roentgenogram taken before operation the heart shadow was very large and on physical examination the cardiac dulness was in excess of the normal. After drainage of the antrums, the apex beat returned to its normal position and the cardiac dulness receded to within the normal limits. The roentgenogram taken three months postoperative showed the cardiac shadow considerably smaller and the sinuses clear. The other child made an uneventful recovery until a dose of an autogenous vaccine was administered on the eleventh day, when she had a mild break of compensation. A roentgenogram taken of the child at the end of three months did not show any tendency to growth of the sinuses, and it was not until the second picture was taken at the end of six months that any progress in the growth of the sinuses could be seen. These cases cannot be considered safe until it can be demonstrated that the

sinuses are again developing. If we can satisfy ourselves that an arrested sinus had been aroused to new growth, it can be relied on to cope with subsequent infections.

ASTHMA

When a child becomes sensitive to the nasal discharge, the anaphylaxis generally is manifested as a bronchial asthma with or without vasomotor rhinitis or dermatitis. In all six of the seven cases the initial improvement was wonderful, but with subsequent acute infections

Fig. 3.—The tubes displaced out of the ventricle of the vestibule into the anterior nares ready for irrigating.

of the upper respiratory tract it was necessary to institute irrigation of the antrums. The case reported as "unimproved" was of a lad, aged 11, who, at the age of 4, was treated successfully for asthma and vasomotor rhinitis with an autogenus vaccine made from the nasal and bronchial secretions. Because of his past history, it was hoped that drainage of the antrums would relieve his present bronchial discomfort, but permanent results were not obtained, owing to the onset of an acute attack of tuberculosis. The patient reported as having dermatitis also had asthma;

drainage of the antrums gave initial relief from the asthma but did not help to clear the skin lesions, though I hoped that the two conditions were manifestations of the same anaphylaxis. It has been my experience that subsequent attacks of asthma can be benefitted by antral irrigations.

INFECTIONS OF THE MIDDLE EAR AND MASTOID CELLS

During the last winter, five children, with acute mastoiditis requiring surgical interference, had acute purulent maxillary sinusitis. Whether a coincidence or not, the two who had bilateral mastoiditis had bilateral antral suppuration while the three who had unilateral mastoiditis had the antrum of the same side infected. One of each group had the antrums drained before operation, with the hope of preventing the progress of the mastoid suppuration but they both failed to have the desired results. The drainage and irrigation of the antrums made the children more comfortable and possibly eliminated the sinuses as a focus of infection, which otherwise would have prevented the uneventful healing of the mastoid wounds. The patient in the case reported as bilateral chronic purulent otitis media was referred for treatment, with the history that two months previously a bilateral myringotomy was done and that the ears had continued to drain in spite of local treatment and the removal of the tonsils and adenoids. A roentgenogram was made of the mastoid processes and the sinuses. The mastoid processes were symmetrically developed and the cell distribution was in accordance with the age of the patient. There was no indication of any bone necrosis. The roentgenogram of the sinuses revealed a bilateral involvement of the antrums and the ethmoids. The antrums were drained and irrigated daily for ten days. The drainage from the ear was less the second day following the operation, and by the end of a week the middle ears were dry, but four weeks were required for the perforation in the drums to heal.

THE NEUROTIC CHILD

The neurotic child is an entity. It is fretful, precocious in its appetite, restless and difficult to handle, and in the search for a focus of infection in four of these children the pediatrician located chronic sinus suppuration. The improvement in these four after drainage of the sinuses was remarkable and gratifying.

FEVER AND HEADACHE

In three instances the antrums were drained with the expectation of removing the focus of infection, which was considered the cause of a persistent fever. Two of the patients responded favorably while the

third, who had both a high fever and a headache, continued to run a high temperature. In this case the headache was so severe that the condition was considered an acute phenoiditis. The contention was sustained by the roentgenogram, and at operation the sphenoid was found to be filled with a purulent discharge. But the fever and headache continued after the drainage had ceased and eventually the Widal test was positive for typhoid fever.

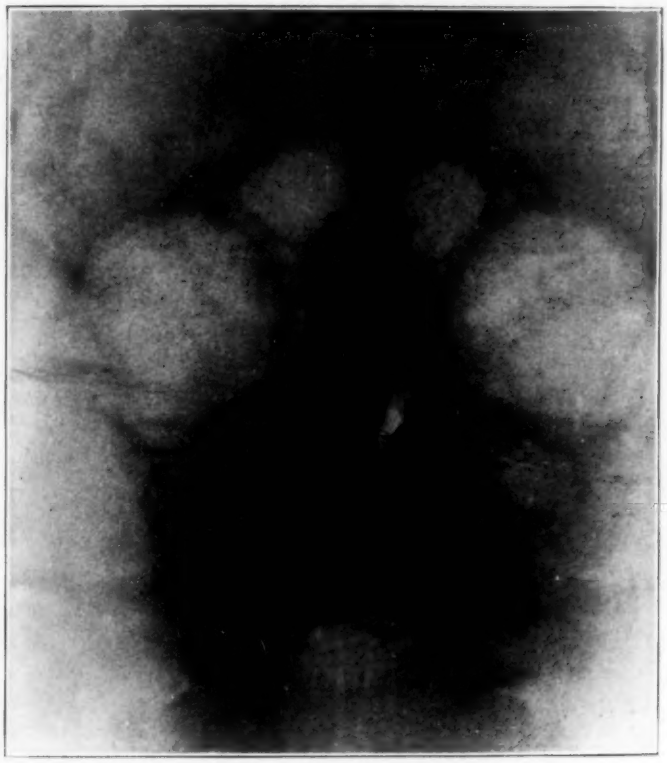

Fig. 4.—Drainage tubes in the antrums.

CYCLIC VOMITING

The removal of the tonsils and the adenoids had relieved one of these patients two years previously of cyclic vomiting, and, on the return of the vomiting which followed an acute attack of influenza, the sinuses were found to be involved. Drainage of the antrums and irrigation of the sinuses quickly stopped the vomiting. The other child previously had had her tonsils and adenoids removed; with the drainage of the antrums by irrigation, the vomiting ceased after the nausea of the anesthesia and as yet has not returned.

ARTHRITIS

Dean [2] has reported gratifying results in the arthritic cases. The one acute case reported in this series was of the polyarthritic type and the deformity of the joints and the bony changes, as shown by the roentgenogram, were such as to consider it a possible arthritis deformans. The pain was readily relieved and the deformity cleared up in less than a month by drainage of the antrums and by irrigation.

OZENA

One of our first sinus patients was a girl, aged 4, who was referred for treatment with a history of nasal obstruction from foul scabs. The nares were found to be filled by dirty scabes. The turbinates were infantile and the discharge appeared to be coming from the anterior ethmoidal cells, so these cells were incised and the nose treated locally over a protracted period with relief from the discharge. No laboratory study was made of the discharge to verify the diagnosis. The other case was of a boy, aged 12, whose nares were filled with foul smelling scabs. After cleansing the membranes the turbinates were found to be undeveloped, and a roentgenogram of the head showed a typical picture of persistent infantile sinuses. Vigorous intranasal treatment was unsuccessful until the antrums were drained and irrigation continued over a period of a year.

DIABETES

A lad, aged 14, being studied as a diabetic subject, was found to have an acute purulent maxillary sinusitis. After drainage of the antrums he rapidly improved; his tolerance for sugars increased sufficiently so that he could tolerate a liberal diet without sugar occurring in the urine.

ORBITAL ABSCESS

The only patient requiring any radical surgery was a girl, aged 13, with an acute orbital abscess following a rupture of an acute ethmoidal abscess. An incision was made after the method of Lynch [3] for the radical frontal sinus operation with the intention of draining the abscess of the orbit and at the same time removing the pressure from the optic nerve. A perforation was found at the ethmoidal frontal angle; in the removal of the granulations the surgery became so extensive that in the end a modified radical frontal operation had been performed. The child made an uneventful recovery.

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2. Dean, L. W.: Paranasal Sinus Disease in Children. University of Iowa Studies, Studies in Medicine, **2**, No. 1.

3. Lynch, R. C.: The Technic of a Pan-Sinusitis Operation, South. M. J. **17**:289 (April) 1924.

CONCLUSIONS

1. The end-results of sinus surgery in children has been satisfactory, the initial improvement being gratifying.

2. The majority of the sinus cases originate in the practice of the pediatrician and should be referred to a rhinologist for treatment.

3. The reabsorption of the discharge by the sinuses is dangerous and productive of constitutional diseases. The intention of the surgery should be the production of continuous drainage and ventilation of the sinuses.

BILATERAL RECURRENT NERVE PARALYSIS DUE TO AORTIC ANEURYSM

REPORT OF A CASE WITH HISTOLOGIC SECTIONS OF THE RECURRENT NERVES *

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Symmetrical bilateral paralyses of the vocal cords due to thoracic aneurysms are very uncommon. Of the few cases recorded, some were reported as abductor paralyses and others as complete recurrent nerve paralyses. A few also have been reported in which the paralysis was complete on one side and incomplete on the other, producing an asymmetrical bilateral paralysis. As the commonest cause of bilateral abductor paralyses is tabes, Semon,[1] in discussing his own case, raised the question whether there might not be neurosyphilis associated with the vascular syphilis to account for the bilateral character of the paralysis. The present case illustrates the great difficulty in the interpretation of vocal cord paralyses, accounting to some extent for the variability of the reports. At the same time it is of especial interest since tabes can be definitely excluded.

REPORT OF CASE

History and Examination.—The patient was a prisoner in a chain gang fourteen months prior to examination, when he was compelled to work in deep water for several hours a day. Six months prior to examination he caught cold and developed shortness of breath, most noticeable while lying down; pain also developed over the sternum. The patient had difficulty in talking and some difficulty in swallowing. He was discharged from the chain gang two months after this, but continued to do manual labor until two days before admission. For the last two days he had been weak and the shortness of breath had become more marked. The patient told of having had several attacks when he could not get his breath and had become unconscious for a short while.

General Appearance.—The patient was a colored man, aged 40, muscular and well built but somewhat undernourished. He had marked respiratory distress. His breathing was wheezy, high pitched and asthmatic in character.

Eyes: The pupils reacted to light and in accommodation. The right pupil was larger than the left. The extraocular movements were normal.

Neck: There was a questionable tracheal tug.

Chest: This was barrel shaped, but symmetrical. No abnormal pulsations were noted. Respiration was 20 per minute. Expansion was equal on both sides. Bronchial fremitus was felt at times over the right upper front. The lungs were resonant throughout. The breath sounds were vesicular with

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* From the Department of Surgery, School of Medicine, Yale University.

* This case is reported through the courtesy of Dr. S. J. Crowe, Johns Hopkins Hospital, Baltimore.

1. Semon, F.: Heymanus Handbuch d. Laryn. u Rhinol. **1**:587 (Complete bibliography up to 1898).

prolonged expiration and sonorous râles throughout, which were apparently transmitted from the upper air passages.

Heart: The point of maximum impulse was seen in the fifth interspace, 12 cm. from the midline. There was a definite systolic thrill at the apex. No pulsations could be felt over the base of the heart or neck. There was cardiac dulness at the first interspace 5 cm. to right and 4 cm. to left; at the second interspace, 4 cm. to the right and 3 cm. to the left; at the fifth interspace, to the sternal border on the right, and to 14 cm. on the left. The heart sounds were clear. No murmurs could be heard. The aortic second sound was greater than the pulmonary second sound.

The radial pulses were synchronous and regular. The pulse rate was 72. Blood pressure was 132 systolic, 90 diastolic.

Abdomen and Genitalia: These showed no abnormalities.

Reflexes: The superficial and deep reflexes were very sluggish.

Temperature: 98.6 F., white blood cells, 8,960 and hemoglobin 80 per cent.

The impression (medical dispensary) was:

1. Asthma, probably secondary.
2. Aortic dilatation or aneurysm.
3. Cardiac hypertrophy, probably myocardial.

The patient was seen in the Laryngological Dispensary, with the foregoing data available. The Wassermann reaction was negative. The patient was having rather marked dyspnea with both inspiratory and expiratory stridor. He

Fig. 1.—Laryngoscopic picture, showing the vocal cords symmetrically fixed in the position of adduction, with the arytenoids in normal position.

had a brassy cough and a hoarse, high pitched falsetto voice. Aside from a middle ear type of deafness the examination was negative except for the larynx.

Larynx.—The epiglottis appeared normal. The mucous membranes of the larynx were diffusely injected but there was no localized edema or ulceration. The arytenoids were symmetrical and appeared normal except for their limitation of motion. The aryepiglottic folds appeared normal. The vocal cords did not appear atrophied. They both appeared fixed in the position of adduction though not quite approximated. They were absolutely symmetrical. They showed no definite movement with respiration and a questionable amount of adduction on phonation. Neither arytenoid appeared rotated forward or inward, as is often seen with complete paralysis of the recurrent nerve.

Diagnosis and Treatment.—The consensus of opinion was that the patient had a bilateral posticus palsy. It was felt that an immediate tracheotomy was imperative. The stridor appeared to be due to the almost complete closure of the glottis by the vocal cords. Complete closure might occur at any time from irritation. The absence of physical signs (except retromanubrial dulness) caused us to disregard aneurysm as a cause of the dyspnea. Unfortunately, a roentgenogram was not made at this time.

A low tracheotomy was performed under local anesthesia. During the operation it was noticed that the trachea was pushed away to the right and a definite tracheal tug was felt. However, after the tracheotomy the stridor was

much less marked. In view of the tracheal tug a roentgenogram was made. It showed a large dense shadow in the mediastinum, which displaced the trachea markedly to the right. The tumor did not pulsate during the fluoroscopic examination which pointed against an aneurysm.

Following the operation, the patient developed bronchopneumonia and died on the eighth day.

Necropsy Findings.—(Necropsy performed by Dr. W. T. McCallum). The anatomic diagnosis was: "Aneurysm of the arch of the aorta with compression of the left recurrent laryngeal, directly by the sac, and of the right recurrent

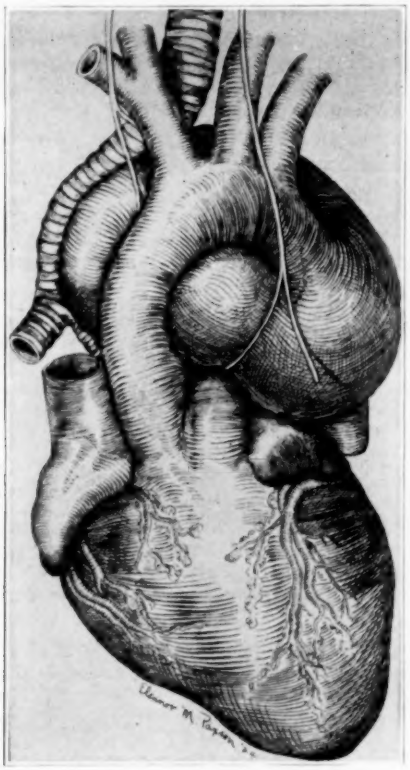

Fig. 2.—Postmortem appearance of aneurysm after opening the chest. The aneurysm was bilobed. The posterior lobe pushed the trachea to the right, compressing the right recurrent nerve between the trachea and the innominate artery. The left recurrent nerve was caught in scar tissue between the aneurysm and the esophagus.

laryngeal indirectly through the medium of the trachea. Displacement and flattening of the trachea; compression of the esophagus; extensive bilateral confluent lobular pneumonia with acute fibrinous pleurisy; healed ulceration of the colon; caseous mesocolic lymph node; caseous nodules in bronchial lymph nodes (sections of the medulla and the spinal cord showed no evidence of degeneration)."

Aneurysm: The aneurysm was about the size of a large orange and arose from the posterior part of the arch of the aorta, and was bilobed. On opening, it was seen to be practically annular. In the region of the aneurysm there was

a marked syphilitic aortitis. The aneurysm was adherent to the trachea and esophagus. The trachea was deflected to the right. It was markedly flattened 4 cm. above the bifurcation but there was no erosion or ulceration. The left recurrent nerve came down around the left lobe of the aneurysm. The nerve appeared to spread out and was bound in scar tissue at the point where the aneurysm was adherent to the esophagus. The right recurrent nerve was compressed between the trachea and the innominate artery but was not caught in scar tissue.

Recurrent Nerves: Microscopic section (Pal-Weigert method) of the right recurrent nerve distal to the aneurysm showed a complete degeneration of all the fibers. The nerve was made up of nerve fibers collected into several distinct bundles. Section of the left recurrent nerve distal to the aneurysm showed much the same condition, except that there were a few normal fibers

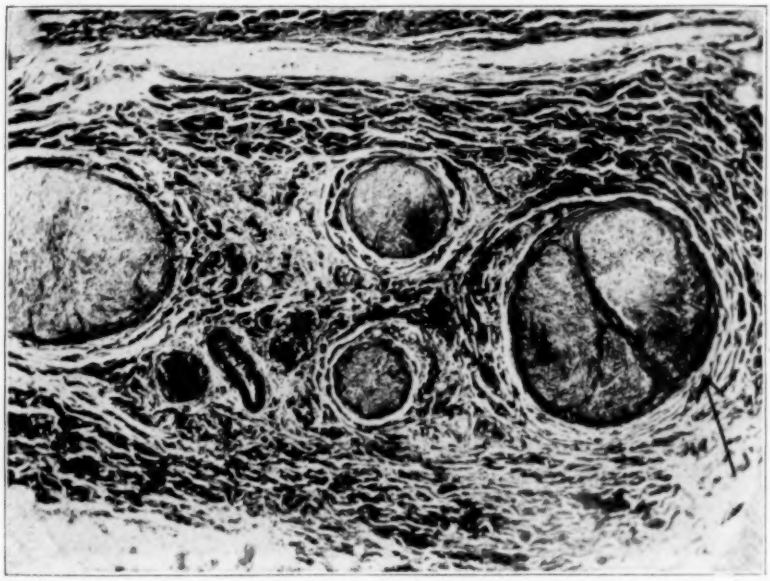

Fig. 3.—Section of the left recurrent nerve distal to the aneurysm (Pal-Weigert method). All fibers were degenerated except those in one small segment of one section of the nerve (arrow). The right recurrent nerve showed complete degeneration of all fibers.

in one of the bundles as shown in the photomicrograph. These normal fibers were not scattered diffusely through the bundle but were collected into one small sector. Sections of both nerves proximal to the aneurysm showed no degenerated fibers.

Vocal Cords: Microscopic section showed the right cord essentially normal. The left cord appeared to be slightly atrophied.

Cricoarytenoid Joints: Sections through the left joint showed no ankylosis and no evidence of any inflammatory process. Sections were not made through the right joint. Grossly, the arytenoid showed no evidence of any inflammatory process or ankylosis.

Muscles: Sections were made of the cricoarytenoid posticus and lateralis and of the arytenoids and thyroarytenoid muscles. There appeared to be no definite changes. If there was any atrophy it was slight.

COMMENT

There have been few cases of bilateral paralyses of the larynx due to an aneurysm. Von Ziemssen [2] states that he has seen two cases both with a symmetrical paralysis. He also states that Traube, Munske and Baeumler all observed similar cases, but in their cases the paralysis was incomplete on one side while it was complete on the other. Apparently Semon's [3] own case was of this latter type. Cartaz reports an unconfirmed case. MacKenzie [4] had two cases. Frankel [5] and Wolfenden [6] each have recorded a case. It is interesting that all of these cases were reported before 1900.

In one of von Ziemssen's cases, sections of the recurrent nerves showed only a few of the fibers degenerated. Since then, the experimental work by Russell [7] has shown the abductor and adductor fiber as separate bundles in the dog. In the present case, as the patient clinically appeared to have an abductor paralysis, it was hoped that sections of the recurrent nerves might show a similar condition. The few normal fibers remaining in the left nerve were not segregated into a separate bundle, but the degeneration of both nerves was too nearly complete to draw any definite conclusions.

In the complete paralysis following goiter operations, the paralyzed cord assumes the position of adduction rather than the cadaveric position. No satisfactory explanation of this has been made. Apparently the same processes are at work in the case reported. Thus the inspiratory stridor, which is not as a rule associated with complete paralysis but is usually assumed to be due to abductor paralysis, cannot be accepted as definitely diagnostic of an abductor paralysis.

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RESTORATION OF LACRIMAL PASSAGE AFTER EXCISION OF SAC

REPORT OF CASE

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History.—In 1918, the patient had the lacrimal sac removed because of chronic purulent dacryocystitis.

The epiphora from which he suffered, prior to excision of sac, was not relieved by the operative procedure. It was so severe that the patient suffered from a chronic eczema of the skin of the face, due to the constant overflow of tears.

Oct. 29, 1923, I placed a silver cannula in the lacrimal canal, after first slitting the lower canaliculus. The patient has been entirely free from epiphora since the operation, and claims that this is the first time that he has been relieved in twelve years.

TECHNIC OF OPERATION WHEN SAC HAS BEEN REMOVED

The canaliculus is slit, as it leads to the lacrimal canal. Incision is then carried deeply down into the canal. After the incision has been completed, the largest probe that is possible is passed through the canal into the nose. A cannula next size smaller than the probe that was introduced is then selected, as it will easily allow its introduction into and through the canal. At present, I am using only two cannulas. The largest has an outside diameter of 4 mm. and the smaller 3.2 mm. I have constructed probes which fit snugly into each cannula and act as obturators, the nasal end of the cannula being tapered to conform with the obturator. Cannulas are 1¾ inches long and may be cut to the required measurements to suit the case, as the lengths required in different lacrimal canals vary from ¾ to 1¾ inches. They are easily cut with scissors. Each has four holes, 2 mm. in diameter near the nasal end, as it is possible that the nasal end may settle into mucus membrane at floor of the nose thus obstructing the lower end. The tube never causes any discomfort, and the patient never feels it. When in position, the cannula extends from the floor of the nose below the inferior turbinate to a point in the conjunctival sac where a probe can easily be passed into cannula, but it never should extend high enough to be exposed to view. In short, it is buried and out of sight. If it extended into the conjunctival sac, it would cause the same amount of irritation and inflammation that was one of the chief factors in discontinuing the use of the old time style.

To keep the opening from the top of the cannula into the conjunctival sac patent, a lacrimal style is placed inside the cannula. This style is easily removed and is kept in position just long enough to insure a permanent

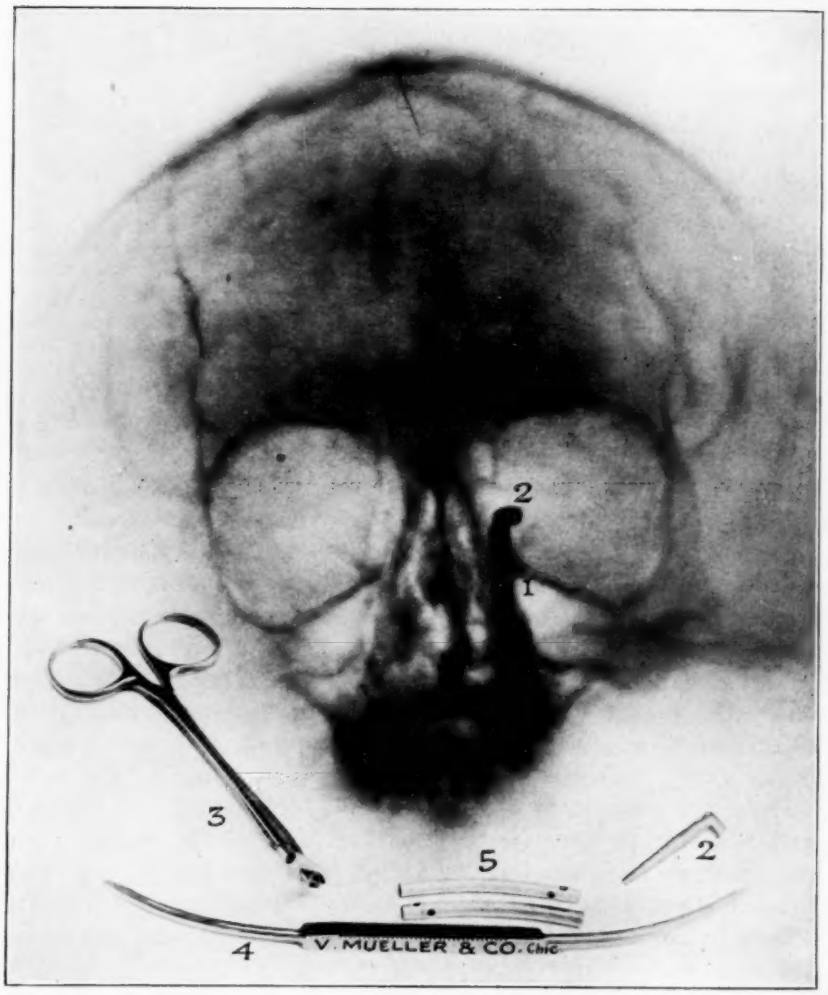

Fig. 1.—Cannula (1) in the lacrimal canal of a patient who had the lacrimal sac removed in 1918 for chronic purulent dacryocystitis; style (2) seen at conjunctival end; this style slips easily into the cannula and can be removed and replaced by the patient; the cannula (3) which has been rolled around the end of the mosquito hemostat and removed in this manner from the lacrimal canal by way of the nose; obturator (4) which fits snugly into the cannula; cannulas (5) which are cut to the length required in each case.

opening and can be taken out and replaced with but little inconvenience to the patient. When the style is removed, the upper end of the cannula should not be visible to the eye but buried in tissues, yet still near enough to the conjunctival opening so that a probe or style may be passed into cannula to insure that the tissue around the conjunctival end of the cannula will not close over upper end. The style shown is of the tubular variety and will drain the tears when in position. It may be removed as occasion requires, if it causes any conjunctival inflammation, and can be replaced when the inflammation subsides. The cannula is always left in position in the lacrimal canal for four months, when it is removed through the nose.

In its removal through the nose, a mosquito hemostat is passed beneath the lower turbinate and closed over the end of the cannula. The hemostat is then gently rotated and the silver cannula which collapses under slight pressure is wound around the hemostat and removed from the nose.

TREATMENT

The treatment of epiphora after excision of the lacrimal sac by the cannula and style method appears to offer a new procedure for the relief of this vexatious problem. That it is possible to reestablish lacrimal drainage after excision of the sac receives considerable confirmation from the fact that cases are recorded when, after extirpation of the sac, drainage had been made possible by the development of a new channel in the lacrimal canal.

In this connection with this subject, Larsen [1] refers to a remarkable event occurring in two of his cases, in which extirpation of the lacrimal sac was followed by its regeneration, the new sac serving its purpose admirably. In one case the new channel formed between the eye and nose was a genuine lacrimal sac; in the other case it was a fistulous communication. The mechanism of this regenerative process, which is exceedingly rare, may perhaps be explained by the teachings of Frieberg, who found that the canaliculi form a pumping system which forces the tears from the conjunctiva into the lacrimal sac when the eyes blink. When the eyes are opened, the canaliculi absorb fluid because of the dilatation of their muscles and of the elasticity of the surrounding tissues. When the eyes are shut, this fluid is driven into the lacrimal sac; regurgitation into the conjunctival sac does not occur because closure of the eyes automatically obstructs the openings of the canaliculi. Frieberg suggest that, in the act of blinking, the canaliculi are capable of driving tears into the lacrimal sac, even when the pressure within it is above that of the atmosphere. In the first of Larsen's cases the canaliculi were

1. Larsen, Harold: Ugesk. f. Læger. **86**:624 (Aug. 21) 1924.

not divided, and it may therefore be assumed that they continued to pump tears down the space left by the resection of the lacrimal sac, and thus kept open a channel in which epithelial cells developed, their growth starting from the interior of the nose.

RESULTS

In a series of twenty-six cases of chronic purulent dacryocystitis that I have treated in the last three and one-half years by the cannula method, there have been four failures with the return of pus. One of these failures was a syphilitic patient, and could not be induced to follow up the treatment of this condition. Two of the purulent cases have been free from pus for over three and one-half years and the remainder have been free, varying in length of time from three and one-half years to the more recent cases.

According to the records in my series, the cannula method does relieve the purulent condition permanently in the majority of cases. If the drainage afforded by the cannula does not clean the sac and duct of its infection, the condition will recur. In such cases, we have a chronic pyogenic membrane that can only be relieved by its removal. If the cannula method is a failure we can still do the extirpation and if the epiphora still continues so as to be unbearable we can try the cannula again for we do not have this chronic pyogenic membrane to deal with on the extirpated sac. I believe that the cures in all types of operative procedure on the lacrimal sac and duct depend on whether this pyogenic membrane has reacted favorably to the drainage. If it does not, a purulent condition returns.

COMMENT

The fact that I have seen few poor results in lacrimal drainage from slitting the lower canaliculus has led me to believe that this is a way of approach which can well be taken advantage of in introducing cannulas into lacrimal sac and canal. This is especially so when we have a strictured lower canaliculus, which may be taken care of in conjunction with the canal by slipping a style into the cannula. The procedure in dealing with epiphora in the extirpated sac which was successful in this case is worth the price of the experiment. If as much attention is paid to the elimination of the cause, whether it is the clearing of the infection in the germ soaked membrane or in specific cases to tubercular or syphilitic conditions, there will be a higher percentage of permanent cures reported in all types of operation. The primary cause in the vast majority of cases is some pathologic condition in the nose, but when called to treat the lacrimal sac infection, the nasal condition has recovered.

After extirpating the sac, the infected membrane is thus gone, but in the treatment of epiphora following this condition, there is no operative procedure left but the cannula. Fortunately, there is no handicap from the infection and it is necessary only to work for reestablishment of the canal from the conjunctiva to the nose. My opinion of this phenomena in Larsen's cases is partly due to the fact that in most operations for extirpation of the lacrimal sac that some or considerable portion of the sac (and in nearly all cases that portion of the sac that passes into the nasolacrimal duct) is not removed. Perhaps it is not expecting too much when the hope is expressed that the new channel made by the cannula will be lined by proliferation of the cylindric epithelium—from the remnants of sac or duct that was not removed in the original operation.

EPHEDRIN SULPHATE, THE ALKALOID OF MA HUANG

EFFECTS OF LOCAL APPLICATIONS ON THE NASAL MUCOUS MEMBRANE: PRELIMINARY REPORT *

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INTRODUCTION

Ephedrin is the active principle of the Chinese drug Ma Huang, and botanically, the plant is identified as *Ephedra vulgaris* var. *helvetica* Fam. *Gnetaceae*. It was one of the medicinal herbs tasted by Emperor Shen Nung some 5,100 years ago and is an ingredient of many famous Chinese prescriptions.[1]

A clinical study of the effects of ephedrin sulphate is at present being conducted by Dr. T. Grier Miller, in the Medical Wards of the University of Pennsylvania Hospital. The plan of investigation outlined by Dr. Miller included a study of the effects of the drug in diseases of the nose and throat, and at his request this phase of the work was undertaken by the Department of Otolaryngology.

SYSTEMIC EFFECTS

Experiments on dogs, cats and rabbits have shown uniformly that the effects of ephedrin on circulation, smooth muscle and secretions are analogous to those of sympathetic stimulation and are qualitatively similar to those of epinephrin.

LOCAL EFFECTS

The idea of using the drug locally in the nose and throat was first conceived and put into effect by Dr. Alice H. Cook, of the Department of Otolaryngology of the Peking Union Medical College. Dr. Cook used it on several patients in the Women's Medical College Hospital of Philadelphia in February, 1925. She found that a 10 per cent. solution of ephedrin sulphate applied to the nasal mucous membrane caused

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* From the Department of Otolaryngology of the University of Pennsylvania.

* Read before the Section on Otology and Laryngology of the College of Physicians of Philadelphia, April 15, 1925.

1. Chen, K. K., and Schmidt, Carl F.: The Action of Ephedrin, the Active Principle of the Chinese Drug Ma Huang, J. Pharmacol. & Exper. Therap. **24**:14 (Dec.) 1924.

almost immediate shrinkage, and that the action was more rapid and complete than is ordinarily the case with a 4 per cent. solution of cocain.[2]

AUTHORS' STUDY

In our study of the drug we investigated the following points: (*a*) The quickness with which the nasal mucosa began to contract, (*b*) the time required to secure full contraction, (*c*) the duration of full contraction and (*d*) the occurrence of unpleasant after-effects.

PATIENTS STUDIED

For the purposes of this study, a group of seventeen patients from the medical wards of the University of Pennsylvania Hospital was selected. Only those presenting turgescence of the nasal mucosa were investigated. None which had nasal discharge, atrophy or any other condition which would complicate the observations was included in the series.

The strength of the solution was 5 per cent.

METHOD

The color and contour of the nasal mucous membrane, especially of the inferior turbinates, were first observed and recorded. The distance of the mesial surface of the turbinate from the septum was likewise measured and recorded.

With a cotton brush, the drug was then lightly painted over the anterior part of the lower turbinate of one side of the nose only, for an area of about 1 cm. in diameter. Care was taken that the brush was not oversaturated, thus preventing the solution from spreading over tissues to which it had not been intentionally applied.

After the application, the turbinate was observed frequently during the following ten minutes, and the color, size, contour and irritability were noted. For the sake of comparison the opposite side was left untreated, and was examined with equal frequency.

Following this, local conditions were noted at hourly intervals for six successive hours, and finally at the end of twenty-four hours.

RESULTS

Contraction.—In every case, the turbinate began to shrink in from a few seconds to one minute after the application was made. The process of contraction proceeded with marked rapidity, and the maximum was established in from one and one-quarter to five minutes, or in an average time for the series of two and one-third minutes.

2. Schmidt, C. F.: Personal communication to Dr. T. Grier Miller, May 5, 1925.

Extent of the Contraction.—A noticeable fact was that the turbinate in every case became contracted throughout its entire length, in spite of the fact that the drug was applied only to the anterior end. The general outline of the mesial surface changed from convex to concave, and the lower border was so contracted that it gave the appearance of being drawn upward. Absorption was evidently free.

The modeling of the mesial surface in every case was altered from the usual rounded character to an irregular, undulating contour. As the latter is the normal appearance of the bare turbinate bone itself, it is evident that contraction was so complete and the mucosa became so thin and flat that it fit the bone as a glove would fit the finger.

In a few cases the turbinate was found to be so congested and swollen that it was in contact with the nasal septum. The application of the drug in the cases promptly produced a separation of 0.3 in. or more between the two surfaces previously in contact.

Color of the Turbinate Mucosa.—This color was invariably altered to a paler hue, but the extreme pallor, the white ischemia, such as follows the local application of epinephrin chlorid in 1 : 1000 strength, never appeared. The pallor at its maximum was of a notably gray tint, with very little suggestion of pink. Areas of varying degrees of pale redness were occasionally seen.

Relaxation.—The average length of elapsed time from the application of the drug to the first noticeable relaxation of the turbinate mucosa was two hours and thirty-five minutes.

Complete relaxation was established in an average time of three hours and seventeen minutes.

AFTER EFFECTS

There was no sign of irritation of the mucous membrane in any of the patients, either on the same day or on the day following. There was no sneezing, and the only subjective sensation spoken of by the patients was the ability to breathe more freely through the nostril on the side to which the drug was applied.

CONCLUSIONS

Our rather limited study has shown that in ephedrin sulphate we have a drug for local use in the nose which has all the advantages of epinephrin and perhaps none of the disadvantages. The extreme

degree of nasal irritation which so frequently follows the local use of the latter drug was conspicuously absent in all our cases.

The therapeutic possibilities of ephedrin in otolaryngologic medicine and surgery will naturally suggest themselves to specialists in this branch of medicine.

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LUNG ABSCESSES CURED BY BRONCHOSCOPY

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This paper deals with six patients with lung abscess which were cured by bronchoscopic treatment. Three followed tonsillectomy under general anesthesia. So far as could be ascertained, there was no pre-existing or predisposing pulmonary condition in any of these cases. In one of the tonsillectomies, a detail in the operative procedure was found which might have had a bearing on the production of the abscess. In this instance the patient, M. H., was kept on the operating table under ether anesthesia for one hour and forty minutes. Prolonged anesthesia could account for interference with the expelling function of the bronchial tree, and perhaps of part of the lung parenchyma. Injury caused by prolonged or concentrated anesthesia has been mentioned by Keen, Bevan, Herb, McDowell and others. I called attention to the increased production of mucus when the ether is forced or given in too great a concentration, in a study [1] of the cough reflex during tonsillectomy. Herb [2] calls attention to mucus inundation and advocates properly conducted open anesthesia. She refers to the probable destruction of protective epithelium by too great concentration of the ether vapor.

I have, for a long time, held to the opinion that consideration must be given to those factors which interfere with expulsion from the tracheobronchial tree rather than to those factors which permit the aspiration of the pharyngeal content. In bronchoscopic studies of 200 tonsillectomies under general anesthesia, 155 were found to have blood and mucus in varying quantity in the tracheobronchial tree, yet none of these patients developed pulmonary disease. We should not, therefore, be so much concerned with the aspiration of the blood and mucus as we should with the lack of expulsion of the aspirated material. Attention should be paid to any condition of the pulmonary tract that might unfavorably influence the normal expulsion effort. This phase of the subject has been dealt with at greater length elsewhere.

REPORT OF CASES

CASE 1.—M. H., a woman, aged 30, was admitted, in May, 1921, to the medical service of Dr. Merrill, at the Kings County Hospital, with a clinical picture and a diagnosis of lung abscess. Her previous illnesses and family history had no bearing on her condition. The tonsils had been removed under

1. Myerson, M. C.: Bronchoscopic Observations on the Cough Reflex in Tonsillectomy Under General Anesthesia, Laryngoscope **34**:63 (Jan.) 1924.
2. Herb, I. C.: Postoperative Lung Complications, J. A. M. A. **79**:339-342 (July 29) 1922.

ether anesthesia about one month before. The records showed that she had been under the anesthetic for one hour and forty minutes. Twelve days after operation, she began to vomit, coughed and expectorated a foul-smelling fluid. When admitted to the hospital she was expectorating a cup and a half of foul smelling sputum daily; she could not sleep because of the cough, and was very sick. The temperature ranged between 99 and 103 F., and the pulse was elevated to between 90 and 116. Physical examination revealed an area of percussion dulness at the right base anteriorly; with this later there was elicited impaired resonance, decreased fremitus and decreased breath sounds over the same area. The roentgen-ray examination verified the diagnosis of right lower lobe abscess. This patient was given expectant treatment for the next two months, during which time she showed no tendency toward recovery. She was referred for bronchoscopic study and treatment. The right lower lobe bronchus was found to be markedly congested; from an anterior branch of this bronchus, after the usual cleansing by aspiration, with each expiratory effort a thick purulent exudate was seen. From July, 1921, until March, 1922, bronchoscopy was performed on this patient at weekly or biweekly intervals twenty-eight times, irrigation and suctin being performed each time. She has been free from pulmonary exudate or cough since March, 1922, and has had a normal and healthy existence since then. This case demonstrates well what can be accomplished with the bronchoscope in the treatment of these conditions. When the treatment of this patient was begun, her temperature was elevated. The fever disappeared as soon as the cavity was cleared out; the fever and associated cough and discomfort only returned when the cavity filled up and retained its septic content. This situation was efficaciously handled by the proper frequency of irrigations.

Case 2.—T. K., a boy, aged 4 years, was seen, July 9, 1924, at the Rockaway Beach Hospital, on the service of Dr. M. Weinstein, thirteen days after the beginning of the illness. A tonsillectomy had been performed under general anesthesia on June 20. Six days after operation, the boy had a pain in the right side of the chest, his temperature was 103 F., he coughed frequently and expectorated a foul smelling sputum. Roentgen-ray study revealed an abscess in the upper portion of the right lower lobe, clearly showing a fluid level. Bronchoscopy was performed and the branch bronchus from which pus was seen to enter into the lobe bronchus, was aspirated. There was an almost immediate favorable change in the clinical picture. The temperature dropped to nearly normal, the amount of expectoration was markedly decreased, so much so that cough was infrequent. There was no longer an odor to the sputum. The child continued well for about a week when his temperature became slightly elevated; there was an increase in the amount of sputum and a slight odor could be detected. July 21, twelve days later, bronchoscopy and irrigation were again performed. Two days after this irrigation there was no cough or expectoration, and there has been none since. Today the boy is perfectly well and enjoying life as well as before the operation.

Case 3.—N. L., a girl, aged 3, was admitted, Nov. 11, 1924, to the Beth Israel Hospital, on the service of Dr. Alfred H. Hess. During the latter part of October, a tonsillectomy had been performed. Two weeks later the child was admitted to the hospital with a history of cough, fever, restlessness and a foul odor to the breath. The symptoms had begun one week after the tonsillectomy. On admission, the leukocytes numbered 18,000, with a polymorphonuclear percentage of 77. Roentgenograms revealed a cavitation of the left upper lobe which showed a definite fluid level. Bronchoscopy was carried out and aspiration of the left upper lobe bronchus was performed. In this case, the 4 mm. bronchoscope was made to enter directly into the upper lobe bronchus and the pus could be seen exuding with each expiration. The appearance of the pus with each expiration shows the effect of the compression of the surrounding lung parenchyma on retained secretions which are held in a compressible cavity. Prior to bronchoscopy, the child's temperature ranged

between 98.6 and 103 or 104 F.; after bronchoscopy, the temperature went no higher than 102.4 F., and this during the first forty-eight hours after bronchoscopy, the direct result of the reaction to the procedure. After the first forty-eight hours the temperature gradually returned to normal. Roentgen-ray studies demonstrated a rapidly healing lesion, while the child's clinical behavior indicated a recovery. The blood count on November 27, five days after bronchoscopy showed: leukocytes, 7,800; polymorphonuclears, 64 per cent. The child left the hospital December 28, and has been well since.

CASE 4.—H. N., a man, aged 37, was admitted to the service of Dr. Merrill at the Kings County Hospital, Jan. 20, 1924, with a diagnosis of lobar pneumonia. On February 15, the foul odor of his breath was noticed, and the next day he was expectorating a large quantity of foul purulent sputum. The first bronchoscope was performed early in March. At this time there was a large dense shadow in the roentgenogram denoting involvement of the right lower lobe; there was also evidence of fluid in the pleural cavity. Improvement was definite from the time of the first bronchoscopy. The odor disappeared and the quantity of sputum was markedly lessened. Coincidently with this, the pleural effusion became absorbed. After the last and eighth bronchoscopy, he was pronounced cured clinically. He has gained about 40 pounds (18 kg.) and has been in good health since his discharge from the hospital.

CASE 5.—J. F., a man, aged 33, was admitted to the service of Dr. Moses, at the Kings County Hospital, April 5, 1924, with a diagnosis of influenza. He had caught "cold" four months previously, and the "cold" had not left him. He had been a coal shoveller for the last fourteen years. After fifteen days in the hospital, he began to expectorate large quantities of foul smelling sputum. Five days later, bronchoscopy was performed, which corroborated the roentgen-ray finding of an abscess in the middle lobe area. The patient was given four bronchoscopic treatments a week apart. After the last he no longer had any of the symptoms for which treatment had been instituted and went home shortly afterward. Later, roentgen-ray study demonstrated the disappearance of the suppurative lesion. Some months later, January, 1925, this patient was admitted with hemoptysis after having been on a heavy drinking bout for several days. At this time neither his clinical behavior nor a careful medical survey could demonstrate evidence of lung abscess. Whether the hemoptysis originated in the previous site of the abscess or was due to a tuberculous process is difficult to say.

CASE 6.—F. M., a man, aged 55, was admitted to the service of Dr. Moses at the Kings County Hospital, January, 1924. He had a history of grip, and had begun to expectorate foul smelling sputum the day before admission, about the eighth day of his illness. A bronchoscopy was performed a few days after admission and the abscess was localized in the right lower lobe posteriorly, and treated. There was a rapid return to normal after bronchoscopy. So rapid was the return to normal in this patient that I have felt that he would probably have made a spontaneous recovery without any interference. However, there is no doubt in my mind that the bronchoscopy hastened his recovery.

COMMENT

It is to be noted that the longest duration of any of these cases was three months. Perhaps, therefore, the most important conclusion to be drawn from the presentation of these cases is that we can accomplish a great deal if these patients are seen early enough. The temperature drops, the odor disappears, the cough disappears entirely or is markedly decreased, while the amount of sputum is considerably lessened. The entire clinical picture changes. In cases of long or moderately

long duration we cannot hope for such good results. Here certain definite pathologic changes have taken place that will interfere with nature's process in helping to establish a cure.

In the bronchoscopic treatment of these suppurations, a cure is accomplished in the following two stages:

First Stage:
1. Aeration.
2. Irrigation.
3. Evacuation.

Second Stage:
1. Collapse of the cavity.
2. Replacement fibrosis.

The second stage is a purely natural process.

Aeration is accomplished usually by the mere straightening out of the bronchial tree down to the secondary emptying branch by the bronchoscope. Occasionally it may be found necessary to remove obstructive granulations. A majority of cases seen are anaerobic infections, so that aeration destroys the anaerobes and the odor that goes with them. The irrigation is carried out by introducing the solution into the emptying secondary bronchus while the suction apparatus is taking away the thick, viscid exudate that is liberated and forced out by the irrigation. The periphery of the abscess cavity must be compressible or collapsible if we can hope for a cure. Anything in the pathologic process that will interfere with the collapse of the cavity will prevent a cure.

CONCLUSIONS

As bronchoscopists, we must be careful of the prognosis in cases of long standing or of moderately long standing. Just what the time limit is in these cases will have to be decided on a basis of future clinical and pathologic study and observation. For the present, I am of the opinion that an abscess of more than three months' duration will take much longer for the establishment of a cure than one of shorter duration, and most abscesses of longer duration will not terminate as cures. The prognosis for ultimate cure by bronchoscopy in cases of several months' or years' duration must be guarded.

When we consider other types of treatment and their results, bronchoscopic treatment, because of its harmlessness and because it accomplishes to a great extent that which is surgically indicated in abscesses elsewhere, should be given a trial in most abscesses. It is evident that this type of treatment is not applicable in cases of multiple abscess, nor in abscesses of large extent. Bronchoscopic irrigation will benefit these subacute or chronic cases; the duration of the benefit will depend entirely on the morbid process in the lung. Fixed cavities and multiple suppurative areas cannot be helped with any degree of lasting benefit. It, therefore, behooves the bronchoscopist to appreciate

the indications for other types of treatment in lung abscess, and to be able to recognize the time to refer his cases for proper surgical attention.

In the hands of those qualified, bronchoscopy is quite safe. So far as I know, there has been no mortality from lung abscess irrigations. Jackson has repeatedly stressed the absence of mortality or unpleasant complication from bronchoscopy in these cases. There is very little discomfort to the patients, even though children receive no anesthesia and adults are given local laryngeal anesthesia. The patients can be treated in a clinic and can go home shortly after their treatment. Some of them ask for more treatments, both because of the lack of any real discomfort and because of the relief afforded them. Because of this, and because there is a definite mortality and morbidity in the surgery of lung abscess, bronchoscopy should be given a trial in the types of cases before mentioned.

It is known that the earlier a lung abscess is seen the better is the chance for a permanent cure. I have treated several patients with suppurations of several months' or a year's duration whom I have sent away apparently cured, but who returned at some later date with an active suppurative process. It seems that after certain changes have taken place, recurrences are likely in the presence of later acute infection of the upper respiratory tract. Therefore, these patients should be treated before permanent pathologic change has taken place if treatment is to be a real success. These changes spell chronicity of the lesion and chronic lesions are difficult to combat.

30 East Fortieth Street.

PROGRESS IN OTOLARYNGOLOGY

A Summary of the Bibliographic Material Available in the Field of Otolaryngology

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THE PARANASAL CAVITIES

A REVIEW OF THE LITERATURE OF 1924

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ANATOMY

During the year, little investigative work has been done on the morphologic and histologic anatomy of the paranasal sinuses, though not a little general discussion has been ventured.

VanGilse [1] states that in the lateral wall of the sphenoid cavity there is found regularly up to puberty and sometimes later, an aperture in the bone which is to be considered a remnant of the craniopharyngeus lateralis canal and leads, with a connective tissue septum in the shape of a diverticulum, into the subdural space. As this connective tissue layer carries blood and lymph vessels, it is probably of importance in the pneumatization process of the sphenoid sinus.

Shea [2] calls attention to the fact that ethmoid cells are present at birth and develop until puberty is well established; that the sphenoid is generally a distinct cell at birth, growing rapidly after the third year, and reaching full size at 10 years, and that the frontal is formed by the intrusion of an ethmoid cell into the frontal bone. In another paper he refers to the prototype of Wittmaack's infantile mastoid in the persistent infantile ethmoid. He claims that in the persistent infantile spheno-ethmoid labyrinth the pneumatization is subnormal and the capsule hypertrophied, which may be demonstrated in roentgenograms.

Woodman,[3] referring to the danger of extension of pathologic process, suggests the following: the frontal sinus is a cavity with a fairly wide duct draining it from its most dependent portion. It is situated within the diploe of the frontal bone, surrounded by diploetic veins fed by an immensely vascular network of external vessels connected with the longitudinal sinus and dura mater by emissary veins, presenting all the factors for the rapid spread of infection. The ethmoid

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1. VanGilse, P. H. G.: Nederlandsch Tijdschr. v. Geneesk. **68**:1363, 1924.
2. Shea, J. J.: South. M. J. **17**:124 (Feb.) 1924; ibid., **17**:810 (Oct.) 1924; Ann. Otol., Rhinol. & Laryngol. **33**:1256 (Dec.) 1924.
3. Woodman, E. M.: J. Laryngol. & Otol. **39**:363 (July) 1924; Proc. Roy. Soc. Med. **17**:63, 1924.

cells are divided obliquely by a shelf-like partition, the antero-inferior portion of which controls the antrum and entrance to the frontal duct, while the postero-superior part is in close relation to the sphenopalatine ganglion and controls the sphenoid sinus. The vidian nerve in its canal and the second division of the fifth nerve lie in unyielding bony channels at times in close relation to the sphenoid sinus, and chronic pressure must produce pain and neuritis; on the superior and lateral aspects of the sphenoid there is a relation to the cavernous sinus, containing the third, fourth, sixth and first division of the fifth cranial nerve and the carotid artery.

MacGibbon [4] reports a case in which the roentgenogram showed that no frontal sinus was present. Intranasal operation showed an extensive degeneration of both ethmoidal labyrinths. Operation confirmed roentgenographic findings.

Canuyt and Terracol [5] refer to the observations of Steiner, Killian and Hartmann that the frontal sinus may be considered an anterior ethmoid sinus which has penetrated between the two bony plates of the frontal lobe. The anlage of this sinus develops later than the rest of the cells. For this reason the drainage canal of the frontal sinus occupies the space that is left by the development of the other cells. Normally, it opens into the infundibulum which is defined as the upper end of the hiatus semilunaris which is confined posteriorly by the bulla ethmoidalis, anteriorly by the agger nasi and the processus uncinatus. There are many variations, however, and the excretory duct of the frontal sinus may open superiorly or laterally. It may open in pockets anteriorly and superiorly to the infundibulum and also posteriorly to the bulla.

O'Malley [6] states that if the evolution of the olfactory organ is traced through the fishes, amphibia, reptiles, birds and lower mammals to man, there are many interesting phases of progression and regression. First, it is apparently an organ of smell only, then related to taste and assimilation and later to respiration; as this predominates, the more primitive function of the olfaction recedes. The specialized structure of the adult of the lower class becomes vestigial in the adult of the higher class, but in the developing embryo of the latter it is always reproduced to be repressed later. Before the formation of the permanent palate establishes the nose of the mammalian types, the human fetus goes through the phases which we find in the lamprey, dogfish, amphibia, reptiles and birds. In ascending the scale from water to air breathers, the phylogenetic variations of the nose are intimately related to the evolu-

4. MacGibbon, T. A.: J. Laryngol. & Otol. **39**:24 (Jan.) 1924.

5. Canuyt, G., and Terracol, J.: Ann. des mal. de l'oreille, du larynx, etc., Paris **43**:224, 1924; ibid., p. 529, 1924.

6. O'Malley, J. F.: J. Laryngol. & Otol. **39**:57 (Feb.) 1924.

tion of the face and mouth. Keith states that there are three distinct stages: (1) a piscine, in which nose and mouth are formed independently; (2) an amphibian stage, in which the nasal respiratory passage opens on the roof of the mouth, and (3) a mammalian stage, in which it opens into the nasopharynx.

O'Malley traces the morphology of the nose in the cyclostomata, amphibia, reptiles, birds and mammals. The formation of the sinuses appears to be a definite budding out of the mucous membrane lining the lateral walls of the nose, which keeps pace with the cavitation, yet retains continuity with the nasal cavities, and possesses the same type of respiratory epithelium. From this he concludes that the sinuses are intended to participate to some extent in respiration. In the horse they empty during inspiration and fill on expiration, which is contrary to what might be expected. Paulsen's experiments show that inspiration causes a negative and expiration a positive pressure in the nose and antrum in man. By this arrangement cold air never enters the cavity. The presence in the cavities of ciliated epithelium, whose chief function in the respiratory passage is to establish a waving sheet of moisture to facilitate the easier absorption of it by the passing air, may mean that they are intended to complete the saturation of the already warmed air. Small antrums are found in the pig and in the dog. There are no dental roots in the floor. The converse is true of the ox and the horse, which have large sinuses, with teeth roots covered by a layer of bone in the floor. The frontal sinuses of the pig, ox and horse are very large. They communicate by a large opening in the maxillary of the horse but not in the pig and dog.

PHYSIOLOGY

Few papers published during the year have anything beyond the slightest reference to the physiology of the sinuses. I have been able to discover little of importance in the nature of research in this field.

Yates [7] undertook an investigation to discover what part ciliated epithelium plays in combating infection within the nose. Cases were selected in which the patient had a considerable and constant discharge of mucus within the nose, but in whom the mucus passed almost entirely in a backward direction. An attempt was made to find out the manner in which the mucus envelops the inspired micro-organisms by placing within the nose a few drops of 1 per cent. solution of indigocarmin and powdered indigocarmin or lampblack. The mucus picked this up and passed it on; in so doing the mucus was apparently rolled over and over, completely enveloping the coloring matter. Yates injected into the various sinuses a quantity of 0.4 per cent. indigocarmin solution in saline

7. Yates, A. L.: J. Laryngol. & Otol. **39**:554 (Oct.) 1924.

solution. On injection of 10 c.c. of this fluid into the antrum, if the sinus was normal the coloring matter appeared in the nasopharynx in about two minutes; its path could readily be traced from the ostium of the sinus. A simpler method is to wash out a sinus on one occasion with liquid petrolatum and on the next with saline solution; the amount of paraffin remaining furnishes some evidence of the ciliary activity.

Yates concludes that the severity of a sinusitis depends on the power of the mucus to prevent its own destruction by the inspired micro-organism. If the property that the mucus possesses of preventing the passage of water, and hence of water-soluble toxins, is destroyed, a progressively increasing poisoning by these toxins of the ciliated epithelium occurs. As the ciliary paralysis increases, the secretion of mucus is also paralyzed until finally the micro-organisms come to dwell in a symbiotic state in the sinus, and the toxins are readily absorbed with the production of remote symptoms.

PATHOLOGY

While much has been written concerning the pathology and bacteriology of the sinuses, most of it partakes of compilation, repetition or change of form rather than of investigation.

An outstanding paper is one by Saxen,[8] on the pathologic anatomy of carcinoma and papilloma, originating from the nasal cavity and the maxillary sinus. In all, thirty-two patients were treated in the surgical department of the General Hospital at Helsingfors and the removed tumors or parts of them were subject to histologic examination. In eighteen, the maxillary sinus was the probable starting point in fourteen other regions of the nasal cavity. Saxen distinguishes five morphologically characteristic groups: (1) Carcinoma ceratinosum; (2) carcinoma basocellulare; (3) carcinoma cylindrocellular; (4) carcinoma medullare, and (5) papilloma. These groups cannot be strictly differentiated from each other on account of transitional formations. While many investigators agree with Killian that cancroids, and in general all forms of carcinoma originating in the maxillary sinuses, have their matrix in the paradental cells migrating during embryonal life, it seems more probable that these formations start from the metaplastic squamous epithelium of the sinus mucosa, according to Oppikofer's opinion, in cases of similar formations of carcinoma in the nasal cavities and in the frontal and sphenoid sinuses.

The clinical and histologic character of the papilloma is still doubtful. Some investigators classify the growth as malignant, adenoma malignum adenocarcinoma, others consider them benign adenoma, fibroma or fibroepithelioma papillare, also papilloma or papilloma durum. The papilloma

8. Saxen, Arno: Acta Otolaryngol. **6**:543, 1924.

of the maxillary and nasal cavities is on the borderline between benign and malign tumors, some being clinically malignant. Differentiation between papillomatous and carcinomatous type is often difficult.

VanGilse [9] calls attention to the pathologic importance of the canalis craniopharyngeus lateralis referred to under the heading of anatomy. The relation of the canal with its connective tissue septum to the subdural space as well as to the fissura orbitalis superior may perhaps be used for the explanation of postoperative meningitis and retrobulbar neuritis. The presence of a sagittal median wall in the sphenoid sinus, which can be established by sounding and by roentgenograms, may point out a persistence of an opening in the canal.

Reynolds [10] claims that chronic mucosal irritation may cause hypertrophy and that if the mucosa lies over bone, bone changes may occur in the nature of hyperplasia or rarefying osteitis.

Miller [11] reports that maxillary sinus empyema was found at necropsy of three patients dying from cardiac disease, although the sinus involvement had not been recognized before death.

Dickie [12] divides the inflammatory diseases of the sinuses roughly into four groups: (1) acute catarrh, (2) acute suppuration, (3) chronic catarrh, and (4) chronic suppuration; and states that acute catarrh of the antrum is generally part of an acute coryza, the lining being swollen, red and secreting copiously. When the tissues of the middle meatus are shrunk, the occlusion of the ostium yields. Acute suppuration is a further stage of the catarrhal condition, the normal drainage by ciliary action being in abeyance and the antrum being filled with pus. In chronic catarrh of the antrum the mucosa is thick and juicy with a tendency to polypus formation. Dickie claims that there is a remarkable resemblance between the clinical pictures of chronic latent antrum suppuration and active pulmonary tuberculosis. There is an absence of conditions usually associated with focal infections such as rheumatism, neuritis and endocarditis, but every patient was thin and some were even emaciated.

Dennis [13] studied sixty cases of sinus disease with complications, in which there had been some sort of surgical intervention. Twenty-four of these patients had bronchiectasis; twenty-eight, asthma; eight had other troubles such as nephritis, lung abscess, cardiac involvement and arthritis; and in practically all of the patients with bronchiectasis or asthma, the maxillary sinus was diseased in forty-seven out of fifty-two.

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9. VanGilse, P. H. G.: Nederlandsch Tijdschr. v. Geneesk. **68**:1363, 1924.
10. Reynolds, F. E.: J. Laryngol. & Otol. **39**:399 (July) 1924.
11. Miller, J. W.: The Nasal Accessory Sinuses in Cardiopathies, Arch. Int. Med. **34**:177 (Aug.) 1924.
12. Dickie, J. K. M.: Canad. M. A. J. **14**:1067 (Nov.) 1924.
13. Dennis, F. L.: Ann. Otol., Rhinol. & Laryngol. **33**:451 (June) 1924.

It is believed that probably a common factor is responsible for both sinus and chest diseases, and early recognition is essential for the best results.

Behm [14] records a case of a diphtheria carrier who suffered from chronic suppuration of the nose and maxillary sinus. Serum injections had no effect but radical operation on the maxillary caused the diphtheritic pseudomembrane to be discharged. No diphtheria bacilli were found in the maxillary sinus. Within a few weeks the diphtheritic inflammation of the nasal mucous membrane had been healed and Löffler's bacillus could no longer be demonstrated.

PARANASAL SINUSES IN GENERAL

A number of general papers on the paranasal sinuses have been published, including those by Hirsch,[15] Faulkner,[16] Guisez,[17] Macneil,[18] Roberts,[19] Smith,[20] Stucky,[21] Tomassene,[22] Uffenorde,[23] Weingartner [24] and Spielberg.[25]

Faulkner discusses the therapeutics particularly, advising nasal irrigation in the second stage of an inflammatory condition, which, however, should be continued if the exudate becomes purulent. He advises that such operations as submucous resection, partial turbinectomy or puncture of the antrum or sphenoid should be done if the process continues for four or five weeks.

Guisez holds that in nonsuppurative sinusitis the condition should be treated as a real bone abscess, the aim being to cover the cavity with fibrocicatricial tissue by operative procedure.

Hirsch studied sixteen cases of recurrent nasal polypi in which he opened the maxillary sinus and found an extreme catarrhal inflammation in spite of the fact that irrigation was negative. He concludes that recurrent polypi are a product of a chronic catarrhal inflammation of the paranasal sinuses, in view of the coincidence of chronic catarrhal inflammation and recurrent nasal polypi, from the identical histologic nature and from the common retrogression of the nasal polypi after removal of the mucosa of the maxillary sinus affected with chronic catarrhal inflammation.

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14. Behm, M.: Ztschr. f. Hals.- Nasen.- u. Ohrenh. **7**:288, 1924.
15. Hirsch, Oskar: Monatschr. f. Ohrenh. **58**:1043 (Nov.) 1924.
16. Faulkner, E. Ross: J. M. Soc. New Jersey **21**:75 (March) 1924.
17. Guisez, Jean: Bull. d'oto-rhino-laryngol., etc. **22**:49 (March) 1924.
18. Macneil, Frank A.: Canad. M. A. J. **14**:501 (June) 1924.
19. Roberts, Sam: J. Missouri M. A. **21**:12 (Jan.) 1924.
20. Smith, I. R.: Canad. M. A. J. **14**:230 (March) 1924.
21. Stucky, J. A.: Kentucky M. J. **22**:542 (Dec.) 1924.
22. Tomassene, R. A.: Laryngoscope **34**:968 (Dec.) 1924.
23. Uffenorde, W.: Ztschr. f. arztl. Fortbild. **21**:456, 1924.
24. Weingartner, M.: Med. germano-hispano-americ. **1**:1050, 1924.
25. Spielberg, W.: Laryngoscope **33**:844, 1924.

MacNeil appeals for conservatism in the treatment and suggests the following: 1. It is not always possible to determine just how much should be done in an operative way, when one begins treating cases of this particular kind, so diagnosis cannot definitely be made at the beginning. 2. An accurate knowledge of the anatomy of the accessory sinuses is essential before surgery of any description is attempted. 3. Irrigation and puncture are helpful only in certain types of maxillary sinus disease. 4. Second only to careful surgery are the persistence and patience required in following up the after-treatment.

Smith classifies sinus infections as follows: (1) Acute—with or without suppuration; (2) chronic—with or without suppuration; (3) cystic and atrophic; (4) hyperplastic.

Stucky, in his earlier observation, insists that many of the cases of accessory paranasal sinus disease are local manifestations of a systemic condition. He secures best results (1) by reducing the concentration of toxins by elimination; (2) by stimulating oxidization (diet regulation and administration of pleuro-endocrines); (3) by hyperalkalization of the secretions and remineralization (glycerophosphate, calcium) in certain cases, especially of the subacute class. Apart from the occasional us of suction, the only local treatment consisted of postnasal irrigation (55 grains sodium bicarbonate, 55 grains sodium chlorid, 3 drams sugar of milk, 1 pint water).

Uffenorde also contends that inflammations of the paranasal cavities are not to be considered local diseases but are always to be held as relating to general conditions.

Tomassene considers that a deflected septum is often responsible for paranasal conditions in the nose.

White [26] asserts that the most important diagnostic criteria are the history of almost incessant attacks of colds with profuse discharge, serous or mucoid discharge on the lateral walls, presence of a mucoid or purulent discharge on the posterior pharyngeal wall, periodic headaches, sometimes recurring at the same hour each day, tenderness on pressure over the involved sinus; visual disturbances, especially blurring or sudden loss of vision, with pain behind the eyeball, roentgenologic evidence of suppuration or other pathologic conditions, supplemented by transillumination findings; and disorders of the sense of smell (anosmia or parosmia).

Caneghem [27] reviews the different operations and warns against frontal operation in acute sinusitis on account of the danger of progressive osteomyelitis of the cranial bone.

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26. White, Francis W.: M. J. & Rec. **119**:293 (March) 1924.
27. Caneghem, D. Van: Vlaamsch geneesk. Tijdschr. **5**:243, 1924.

Goris [28] reports the third patient, on whom he performed his extensive operation for paralysis of the left external rectus, hemiatrophy of the tongue, excruciating headaches and insomnia. A diagnosis of sphenoid sinusitis with a sequestrum and maxillary sinusitis on the left side was made. The operation consisted of preliminary tracheotomy, complete tamponade of the hypopharynx, median incision of the face from the root of the nose to the upper lip and dissection of the face in two flaps turned back laterally, removal of the anterior and internal walls of the maxillary sinus on one side, treatment of the sinus, tamponade, removal of the anterior and inferior walls of the frontal sinus, of the frontal process and of the ethmoid, transforming half of the face into a wide cavity, thereby making the sphenoid sinus accessible. This was followed by tamponade of the whole cavity, with the same procedure on the other half of the face. Convalescence was interrupted by a peritracheal abscess, erysipelas and chills and fever due to infectious endocarditis and several pulmonary abscesses, but in two months the patient was discharged.

Escat and Laval [29] strongly advocate the orbital route for operation on paranasal sinuses, claiming the following advantages: (1) Operative procedure under perfect control with a minimum of accidents, (2) execution equally easy under general or regional anesthesia, (3) security against any orbito-ocular complication because of the free orbital opening and the protection that can be given to the optical apparatus by carefully keeping the orbital contents out of the danger zone with proper retractors, (4) no disturbance from the temporary detachment of the tendon of the oblique, as diplopia that occurs disappears spontaneously in a few days, (5) no prolapse of the orbital contents into the nasal cavity, no synechia, (6) the most direct way to reach the ethmoid, frontal and sphenoid cavities, as well as the maxillary sinus, (7) the best possible drainage, (8) simplicity of postoperative care, (9) good cosmetic result and (10) the multiplicity of indications. The orbital route applies equally to simple anterior, posterior or total ethmoid empyema, with or without orbital invasion, fronto-ethmoid empyema, ethmoidonasolacrimal empyema, ethmoid mucocele, ethmoidosphenoid empyema, unilateral or bilateral simple sphenoid empyema, pansinusitis, undetermined diffuse polysinusitis and hypophysectomy.

Junod [30] considers that diaphanoscopy has limited and unsafe diagnostic value in determining diseases of the frontal sinus. In the maxillary sinuses, however, it failed in only 9.5 per cent. of his cases.

Trible [31] reports three serious cases of sinus diseases, all of which

28. Goris: Bull. d'oto-rhino-laryngol. **22**:113 (May) 1924.
29. Escat, E., and Laval, F.: Rev. de laryngol., Paris **45**:525 (Aug.) 1924.
30. Junod, A.: Schweiz. med. Wchnschr. **54**:636, 1924.
31. Trible, G. B.: Laryngoscope **34**:912 (Nov.) 1924.

were fatal. 1. Pansinusitis with a cerebral abscess from dental infection, going from the antrum to the ethmoid, then to the frontal, then to extradural abscess or meningitis. 2. Chronic sinusitis belonging to the type associated with poor physique, unhygienic surroundings, liability to osteomyelitis, death being due either to meningitis or septicemia. 3. Antral infection from the teeth, radical operation, the process eventually proving to be epithelioma.

Among the complications mentioned are the following: Hubbard,[32] convulsive tic; Alden,[33] psychosis following ethmoid operations; Birkholz,[34] necrosis of the cerebral, orbital and interfrontal wall, infection by *Bacillus proteus;* Watson-Williams,[35] dull mentality and sciatica; Bohan,[36] hemiplegia, two cases, both patients recovered; Bonner [37] laryngitis; Minnegerode,[38] abscess of the cheek after operation.

Worms [39] and others discuss the relation of headaches to infection of the paranasal sinuses.

Laugier [40] presented ten out of 500 illustrative cases of sinus infection, in which the following were observed: chronic bronchitis, pyelonephritis, articular rheumatism, tonsillitis, asthmatic and pseudoangina attacks, dysphonia, general lassitude, fatigue, loss of memory, persistent cough and chronic maxillary pain.

Miller [41] found that in three patients dying from cardiac disease, empyema of the maxillary sinus was demonstrated at necropsy, although in no instance was sinus involvement recognized before death. Miller feels that roentgen-ray examination of the sinuses is important in all cases of cardiac disease, especially in chronic valvular infection and subacute bacterial endocarditis.

Bilancioni [42] calls attention to the frequency of operative findings which are different from the ones suggested by the symptomatic or radioscopic examination. In one patient who appeared to be suffering from typical inflammation of the ethmoid and maxillary sinuses, no pathologic changes were found on operation. In another case there was clinical and roentgenographic evidence of right purulent frontoethmoido-maxillary sinusitis; on operation it was disclosed that only the maxillary sinus was involved, the frontal sinus being entirely absent

32. Hubbard, E. V.: M. J. & Rec. **119**:402 (April 16) 1924.
33. Alden, A. M.: Laryngoscope **34**:126 (Feb.) 1924.
34. Birkholz: Ztschr. f. Hals-, Nasen- u. Ohrenh. **9**:16 (Sept.) 1924.
35. Watson-Williams, E.: Lancet **2**:1280 (Dec.) 1924.
36. Bohan, P. T.: M. Clin. N. Am. **7**:1075 (Jan.) 1924.
37. Bonner, W. F.: Atlantic M. J. **27**:677 (July) 1924.
38. Minnegerode: Ztschr. f. Hals-, Nasen- u. Ohrenh. **8**:96 (May) 1924.
39. Worms, G.: Internat. oto-rhino-laryngol. **8**:70, 1924.
40. Laugier, A. R.: Bull. Porto Rico M. A. **18**:5 (Dec.) 1924.
41. Miller, Joseph W.: Footnote 11.
42. Bilancioni, G.: Arch. ital. di laryngol. **44**:5, 1924.

and being replaced by a compact mass of eburnated bone. In another case, a round cell sarcoma of ethmoidomaxillary origin was present, with marked exophthalmos, swelling and sharp pain in the malar region. On removal of the anterior wall of the maxillary sinus, it was found full of thick creamy pus. There was no trace of neoplastic tissue present, however. An ethmoid sarcoma had invaded the orbit without involving the antrum. In another case signs of chronic purulent fronto-ethmoid sinusitis were present on the right side and diagnosis was confirmed by fluoroscopy and transillumination. On exploration, a cherry stone was removed from the patient's nose and all symptoms disappeared accordingly.

FRONTAL SINUS

Canuyt and Terracol [43] have made the frontal sinus the subject of study in three papers. They refer to the term "Vacuum Sinus," coined by Sluder, as analogous to the phenomena of lessened air pressure in tubal catarrh. The writers classify the following as causes:

External Causes: (1) The enlargement of the tuberculum septi; (2) decided bending of the septum.

Internal Causes: (1) Malformation of the concha: (*a*) concha bullosa after Zuckerkandl, (*b*) inflammatory hypertrophies; (2) malformation of the middle nasal fossa: (*a*) extreme development of the bulla which causes an application to the processus uncinatus; (*b*) cell shaped swelling of the agger nasi; (*c*) inflammatory swelling of the mucosa.

It is necessary to establish the cause of displacement for therapeutic purposes. After application of cocain and epinephrin, the middle turbinate is pushed aside with a Killian speculum and a sound is introduced into the sinus, accompanied by blowing in of a current of air. When the sound is safely introduced under roentgen-ray control, the cavity may be widened by careful to and fro movement of the sound and if necessary a mild curettment with Vacher's curet.

Lemere [44] describes a case in which an exploratory operation, following injury, had effected a fluctuating swelling, which was found to contain pus. A fistula remained which lead directly into the frontal sinus. Later a Killian operation was performed with complete success.

Lobsenz [45] reports a case in which there had been an intermittent swelling about one-half inch above the left internal canthus which was found to discharge pus. The roentgenogram showed that the corresponding frontal sinus was either small or full of pus and granulation tissue. The operation showed that the floor of the orbit wall had been

43. Canuyt, G., and Terracol, J.: Ann. des mal. de l'oreille, etc. **43**:529, 1924.
44. Lemere, H. B.: Nebraska State M. J. **9**:164 (May) 1924.
45. Lobsenz, N. P.: Laryngoscope **34**:630 (Aug.) 1924.

removed at a previous operation and that one particular portion of the granulation tissue seemed to be prominent. It was carefully curetted away and a clean, round opening was discovered in the posterior plate, three-fourth inch in diameter, with good, hard, white bone forming its margin. Projecting through this opening was a part of the frontal lobe, with apparently no dura, arachnoid or pial covering. It was firmly adherent to the bony margin. The patient recovered without further symptoms.

The operative side of frontal sinus diseases has received much attention. Barany [46] claims that the Killian operation supplies two incompatible factors, namely, obliteration of the frontal sinus and free communication with the nasal cavity. He opens the sinus externally over the lacrimal bone, removing only its inferior osseous wall together with a small portion of the lower anterior wall. The mucosal lining is incised so as to form a quadrangular flap which is used to cover the processus nasalis ossis frontalis. The orbital wall is removed sufficiently to expose the deep orbital cells in the ethmoid bone. These are thoroughly curetted. The frontal mucosa is left to as great an extent as possible.

Gumperz [47] presents his operation which is somewhat similar to that of Halle. Both operations have the advantage of radical curettment of the anterior ethmoid cells, and the formation of a mucosal flap to cover the operative field and to protect the lamina cribrosa. Gumperz employs infiltration anesthesia. The usual Denker's incision is made, the soft parts covering the frontal process are pushed aside until the crista lacrimalis and nasofrontal suture come into view. The mucous membrane of the middle meatus is elevated as far as the region of the uncinate process, the soft parts of the cheek and nose and the mucosa of the middle nasal meatus are retracted with special hooks and the frontal process, denuded through its extent, is resected with special forceps, the highest point of the anterior crista lacrimalis being used as a point of orientation. After removal of the bulla ethmoidalis, resection of the uncinate process and curettment of the ethmoid cells, the remaining upper parts of the frontal process are removed by light blows of the chisel, directed approximately parallel to the base of the skull, after which the bone mass of the frontal sinus can be thinned from behind forward with a chisel or rasp. The mucosal flap is laid bare laterally and anteriorly on the wall of the nose and is fixed with a loose tampon. The mouth wound is closed with catgut sutures.

Levesco [48] describes Sebileau's technic as follows: An incision is made along and somewhat above the orbital arch as far as the median

46. Barany, R.: Acta Otolaryngol. **7**:41, 1924.
47. Gumperz, R.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **9**:291, 1924.
48. Levesco, C.: Ann. d. mal. de l'oreille, etc. **43**:785 (Aug.) 1924.

line; incisions of the periosteum and supra-orbital nerve, freely sectioned to prevent subsequent neuralgia; trepanation of the sinus outside of the frontonasal angle close to the orbital border is made; the cavity is explored to ascertain the extent of the lesion; the trephine opening is enlarged according to the nature of the lesion, care being taken to preserve the orbital border intact; the septum between the two frontal sinuses is destroyed, which permits curettage if necessary; the bridge of bone between the two nasofrontal orifices posterior to the cribriform plate is resected; resection of as much of the anterior border of the perpendicular plate of the ethmoid as is necessary is done; the ethmoid cells are removed with Luc's forceps; the skin is sutured without a drain and bandages are applied without pressure, to prevent sinking in of the orbital ridge.

Heindl's [49] case was an extensive process in which the bulbus protruded downward and outward and symptoms of meningeal irritation were present for two days. Reidel's operation with Marshik's incision was done. The supra-orbital and other portions of the frontal bone were black and much thick pus and necrotic mucous membrane with polypi were removed. The nasofrontal duct was found obliterated, necessitating an opening into the bone through the ethmoid cells. In spite of the extensive operation, the cosmetic result was satisfactory.

Lewis [50] holds that the treatment of chronic suppuration of the frontal sinuses calls for some form of radical surgical procedure in a vast majority of cases; he favors the external route as the only means by which the sinus can be properly inspected, the disease process removed and adequate nasal drainage instituted. He has found the following modification of Killian's operation successful: (*a*) suturing the eyelids together for protection; (*b*) infiltrating the tissues with 0.5 per cent. procain and 1:10,000 epinephrin to control hemorrhage; (*c*) the double incision of Coakley; (*d*) the avoidance of overhang in the upper margin of large sinuses, and the removal of septums which may harbor accessory cells. Howarth's method, which gives good results leaving a minimum of scar, consists in the removal of the floor of the frontal as far as the supra-orbital margin without disturbing the membrane of the sinus, removal of the nasofrontal duct and drainage into the nose with a large rubber tube. Lewis has performed the radical operation sixty-five times, secondary operation being required in fourteen patients. Four died, two from multiple brain abscess and two from meningitis, confirmed by necropsy. Only nine cases failed to show involvement of the ethmoid and thirteen presented diseases of the antrum requiring radical operation. In three cases the dura was exposed from necrosis

49. Heindl: Monatschr. f. Ohrenh. **58**:649, 1924.
50. Lewis, F. O.: Therap. Gaz. **40**:229 (April) 1924.

of the posterior plate and no intracranial complications followed the operation in any of these cases.

Lynch [51] describes his operation in which the periosteum is elevated only from the lower half of the bone along the incision. The orbital wall of the sinus is carefully removed after the lacrimal bone and lamina papyracea of the ethmoid has been exposed. In this way the widest access to the anterior wall of the sphenoid is given. The mucosa of the frontal sinus is curetted away and a strip of gauze soaked in iodin is packed in the cavity. The roof cells of the ethmoid can be cleaned out by direct vision without fear of injury to the cribriform plate. The anterior wall of the sphenoid is removed entirely and the lining membrane is completely eviscerated. A drainage tube, about one-fourth inch in diameter, is passed through the vestibule of the nose and is permitted to remain for five days. After the removal of the tube a large dilator or sound is passed into the sinus, a process which is repeated usually in ten days.

Nasiell [52] has good results with Halle's internal frontal sinus operation. The operator should have experience by practice on the cadaver. Care should be exercised in using the cylindric reamer for widening the nasofrontal canal. This writer opposes the operation when less drastic methods fail, such as aspiration, lavage, application of heat, middle anterior conchotomy, evacuation of the anterior ethmoid bone and enlargement with Ritter's sounds when there are no serious complications present.

Roberts [53] contends that the causes for failure in operation on the frontal sinus are inadequate nasal opening, cicatricial closure of the intranasal opening and failure to free the sinus of infected polypoid tissue and carious bone. He uses the through and through tube drainage advocated in the Lothrop operation, particularly when there is bilateral frontal sinus involvement.

Seiffert [54] holds that the drawback in the Killian frontal sinus operation is the formation of a dead space in the anterior median angle of the frontal sinus and the gradual narrowing or total obliteration of the frontal nasal canal. This causes constant recurrences of frontal sinus suppuration which require renewed operations. Seiffert has treated more than twenty cases in the following way. He covers the denuded surface with Thiersch's epithelial flaps taken from the skin of the thigh, and inserts a rubber drain. On the wound a light pressure dressing is applied, in order to prevent the formation of hematoma. The mucosa of the

51. Lynch, R. C.: South. M. J. **17**:289 (April) 1924.
52. Nasiell, Vilhelm: Acta Otolaryngol. **7**:49, 1924.
53. Roberts, S. E.: Ann. Otol., Rhinol. & Laryngol. **33**:735 (Sept.) 1924.
54. Seiffert, A.: Beitr. z. klin. Chir. **131**:66, 1924.

frontal sinus in a series of cases was not curetted. In patients on whom operation was performed, healing occurred by first intention and there was no recurrence.

Arbuckle [55] has found Thiersch's skin graft on the nasofrontal duct a most advantageous factor in the external operation.

Albrecht [56] contrives the exposure of the frontal and ethmoidal sinuses by submucous resection of the nasal septum. When the turbinate is pushed aside the middle meatus thereby becomes most accessible.

Golowin [57] uses the osteoplastic operations in traumatic conditions of the frontal sinus and prevents disfiguration by the complete removal of the mucosa of the sinus, causing its complete obliteration.

Jousseaume and Wisner [58] report a case in which a fistula appeared in the middle of the forehead following frontal sinus operation.

ETHMOID CELLS

Reference has already been made to Gumperz [59] operation of the ethmoid cells and frontal process.

Albrecht [60] prefers Halle's method of cleaning out of the posterior and middle ethmoid rather than opening the anterior ethmoid and frontal sinuses.

McNaught [61] classifies chronic ethmoid conditions as hyperplastic and empyemal, emphasizing that in spite of the existing ethmoid infection, ocular inspection of the nose may not show any disease present. There is often a unilateral or bilateral granular pharyngitis and sometimes cervical adenitis.

Kompanejetz [62] describes two cases in which an inflammation of the ethmoid was followed rapidly by fistula formation due to necrotic sinusitis. Intranasal operative procedure relieved the fistula without further treatment.

Grant [63] reports a case of fistula of the upper eyelid following suppuration of the anterior ethmoid cells. Recovery followed incision and curettment.

Gibb [64] holds that in anterior ethmoidal sinus disease, pain is referred to the eyeball and maxillary process across the bridge of the nose. In

55. Arbuckle, M. F.: South. M. J. **17**:293 (April) 1924.
56. Albrecht, T.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **7**:241 (Feb.) 1924.
57. Golowin, A. S.: Klin. Monatsbl. f. Augenh. **72**:438 (May) 1924.
58. Jousseaume and Wisner: Ann. d. mal. de l'oreille, etc. **43**:190, 1924; ibid., Arch. internat. de laryngol. **30**:600, 1924.
59. Gumperz, R.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **9**:291, 1924.
60. Albrecht, T.: Footnote 56.
61. McNaught, Harvard: California & West. Med. **22**:373 (Aug.) 1924.
62. Kompanejetz, S.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **9**:1 (Sept.) 1924.
63. Grant, H.: J. Michigan M. S. **23**:116 (March) 1924.
64. Gibb, J. A.: J. Laryngol. & Otol. **39**:15 (Jan.) 1924.

posterior ethmoidal conditions, the location of the pain is at back of the eye and on the top of the head.

Canuyt and Terracol [65] describe what they call a new disease, designating it as the forming and recurring polyposes of youth. They found seventy-five cases, including their own and those mentioned in the literature. The picture shows displacement of both sides of the nose by an unusual number of mucous polypi. The disease occurs almost exclusively in adolescence, apparently mainly in females. There is swelling of the nose, the bridge is broadened two or three times the usual size, the cartilagenous portion of the normal tissue is rather atrophic and the wings are flattened. In older persons, the polypi cause swelling of the cartilagenous portion of the nose. Recurrence of polypi occurs even after radical operation of the accessory cavities. The writers consider the disease primarily an inflammatory condition of the sphenoid bone by which rarefaction of the ethmoid cell wall occurs. The condition bears a resemblance to the disease known as gundu in negroes which is supposed to be due to syphilis parentalis. Positive Wassermann reactions were frequently found in these cases.

Moore [66] reports a case in which great difficulty was experienced in making a diagnosis on account of the vague symptoms, extreme prostration and rapid emaciation. Burlanescu and Fsetsu [67] report another case in which an empyema of the ethmoid cells erupted into the frontal sinus.

Practically all of the reports of operative work on the ethmoid cells are combined with those on operations of the adjacent cavities and are considered in this review accordingly.

SPHENOID SINUS

Coulet [68] discusses sphenoid headaches and states that women generally describe their pains in a definite way. They feel them either on the crown of their head with radiations to the neck down to the shoulders, or they put their extended forefinger to the temples to signify the penetrating direction of the pains to the depth of the head. Some put their bent digit into the mouth behind the uvula to indicate the direction. Temporary visual disturbances are also common. Rhinoscopically, it frequently happens that hardly anything can be found except perhaps a little mucopus at the posterior end of the conchae or at the posterior wall of the pharynx. Sounding at the anterior wall of the sphenoidal

65. Canuyt, G., and Terracol, J.: Arch. internat. de laryngol., etc. **3**:143, 1924.

66. Moore, W. F.: Laryngoscope **34**:26 (Jan.) 1924.

67. Burlanescu and Fsetsu: Soc. roumaine d'oto-rhino-laryngol. **22**:1, 1924; ibid., Arch. internat. de laryngol., etc. **3**:718, 1924.

68. Coulet, G.: Rev. méd. de l'est. **52**:462, 1924.

sinus causes a distinct pain and the patient spontaneously tells that the right spot was touched.

Fraser [69] calls attention to the great and increasing frequency with which operation is performed on the sphenoid sinus. He considers that the mere inspection of the sinus at necropsy is misleading, because the sphenoid sinus may contain stomach contents which well up at the moment of death, or mucus which has accumulated in the nose and pharynx owing to diminution of ciliary action and absence of the normal means of removal such as coughing, hawking or blowing the nose. Clinical experience supports the view that inflammation of the sphenoid sinus is less common than similar affections of the other sinuses. For instance, Oppikofer found the sphenoid affected three times in 155 cases of chronic suppuration. So far as his own practice is concerned, he considers sphenoidal sinus disease a rare infection.

Calderin [70] reviews the present state of the surgery of the sphenoid sinus and advocates that the operation be performed in doubtful cases even if the indication is not clear. He refers to what he calls obsolete methods of operation—transnasal, transmaxillary, transorbito-ethmoidal and transfrontal, and considers the perseptal operation of Hirsch as the operation of choice.

In common with many others, Baldenweck [71] prefers the Hirsch-Segura interseptal operation.

Mink [72] proved by manometric examination that it is better to loosen a broad piece (8 mm.) from the middle turbinate, which is then pushed to one side with a long speculum and by a simultaneous pushing aside or resection of the ethmoid cells, to make a free pathway into the processus spheno-ethmoidalis and to the ostium sphenoidalis. Mink has constructed a double chisel for splitting the middle turbinate which can be inserted in a nose which has been narrowed by septum deflection. Thus far his method has not been tested on a living subject.

Menzel [73] describes his puncture needle which he first demonstrated in 1914. The instrument consists of a hollow handle 14 cm. long with its pointed end bent at an angle of 120 degrees. The needle is mounted on a strong handle bent at an angle. After anesthetizing the olfactory fissure and the anterior sphenoidal wall, the needle is introduced through the olfactory fissure until it reaches the wall of the sphenoid. The handle is then raised somewhat and the needle is pushed through the anterior wall.

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69. Fraser, J. S.: J. Laryngol. & Otol. **39**:393 (July) 1924.
70. Calderin, A. M.: Med. ibera., **18**:16, 1924.
71. Baldenweck, L.: Arch. internat. de laryngol., etc. **30**:403, 1924.
72. Mink, P. J.: Nederlandsch Tijdschr. v. Geneesk. **68**:1845 (April) 1924.
73. Menzel, K. M.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **8**:185 (May) 1924.

Hagemann [74] describes an exploratory sphenoid sinus trocar which may be inserted through the ostium when possible or forced through the sphenoid wall, the stylet afterward being removed.

MAXILLARY SINUS

Got [75] reports a case of polypi of the maxillary antrum which extended into the nasal pharynx. He also reports another case in which polypi filled the sinus after Ogston-Luc operation.

Halphen and Raoul [76] saw a case in which there was a giant cystic polyp of the maxillary sinus which was opened by a trocar. There was no evidence that a paradental cyst was present.

Alden [77] was successful in relieving a case of sphenopalatine ganglion pain syndrome by a maxillary sinus operation.

Kettner [78] refers to an osteomyelitis of the maxilla caused by mechanical accidents in infants and in young children. Two cases are mentioned, one in which there was suppurative destruction of the entire frontal wall of the maxilla and suppurative alveoli. The use of a tooth paste containing potassium chlorate was held accountable for this condition. In the second case there was extended necrosis of the alveolar process in an infant, aged 2 weeks, resulting from perforation caused by cleaning the nasal passage with a small sponge tied to a stick.

Kompanejetz [79] reports a case of empyema of the maxillary sinus of dental origin which lead to necrosis of the facial wall and external rupture.

Blohmke [80] inveighs against the inadequacy of nasal and dental therapy for the operative treatment of infected maxillary sinuses and maxillary cysts. He holds that progress is only possible if the work is more intensive than extensive. It must be admitted that in many cases both the ethmoid and the frontal sinuses combine to cause an empyema, and, unless these conditions are relieved, cure is not possible.

Claiming that the causes of chronic maxillary sinus suppuration cannot always safely be established, Bonnet-Roy [81] calls attention to the differences which exist between an empyema of the maxillary sinus, caused by rupture of the abscess of a root of a tooth into the antrum, and sinusitis maxillaris, which is an infection of the maxillary sinus.

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74. Hagemann, J. A.: Eye, Ear, Nose and Throat Monthly **3**:206 (May) 1924.
75. Got, A.: Rev. de laryngol., d'otol. et de rhinol. **45**:41 (Jan.) 1924.
76. Halphen, L., and Raoul, R.: Arch. internat. de laryngol. **3**:445 (April) 1924.
77. Alden, A. M.: Laryngoscope **34**:438 (June) 1924.
78. Kettner, A. H.: München. med. Wchnschr. **71**:207 (Feb. 15) 1924.
79. Kompanejetz, S.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **9**:1 (Sept.) 1924.
80. Blohmke: Vrtljschr. f. Zahn. **40**:105, 1924.
81. Bonnet-Roy, F.: Bull. méd., Paris, **38**:608, 1924.

A study of his cases of maxillary sinus disease leads Dennis [82] to the following observations: (1) cough of a persistent character dominating the picture; (2) absence of positive findings by transillumination in eight of the cases; (3) positive findings by roentgenogram in all of the cases against the doubtful findings by transillumination; (4) the presence of bronchial symptoms in most of them; (5) the low grade of pharyngeal and laryngeal irritation as compared with the amount of cough; (6) the presence of pus, easily demonstrable on the affected side; (7) the rapid diminution of the cough after the first removal of pus without any relation to the continuation of the secretion.

McMurray [83] states that a careful history and thorough nasal examination, especially of the middle meatus and the postnasal space, are the first steps. He holds that bogginess of the mucosa under the middle turbinate and persistent redness and hypertrophy behind the posterior pillar of the tonsil, extending upward behind the palate, are suggestive signs; that negative transillumination is not conclusive and that irrigation may be done through the middle or inferior meatus. He shows how to avoid the three chief dangers: the use of too much force with the syringe, failure to insert needle or cannula through the mucosa leaving it in between the latter and the bone and inserting the needle too far. He did not find the nasopharyngoscope of any value.

Worms [84] states that the diagnosis of chronic maxillary sinusitis in typical cases is easily made by the unilateral rhinorrhea, nasal obstruction and subjective cacosmia. Pain is not always present.

The Stauffer [85] technic for maxillary operation consists in a modified Caldwell-Luc operation, because with a good headlight the operator can see every step of the operation and it can be carried out with the least possible destruction and injury to the nasal mucosa. A saturated cocain solution is applied to the sphenopalatine ganglion after Sluder's method. The soft parts and periosteum of the anterior antral wall are injected freely with 1 per cent. procain, and ephinephrin solution 1 : 1,000, 1 drop to the dram. The incision is made from the midline to the third molar tooth, at the gingivolabial junction. The mucosa and periosteum are elevated to the level of the infraorbital foramen, and an opening is made to the center of the canine fossa with a drill large enough to permit inspection of the cavity. The opening is enlarged and the sinus walls are wiped with 3.5 per cent. tincture of iodin. A counter opening is made by removing all of the nasal wall, as little of the anterior wall being removed as is consistent with good inspection.

82. Dennis, G. J.: Ann. Otol., Rhinol. & Laryngol. **33**:1356 (Dec.) 1924.
83. McMurray, J. B.: Atlantic M. J. **27**:815 (Sept.) 1924.
84. Worms, G.: Médécine **5**:289 (Jan.) 1924.
85. Stauffer, F.: Eye, Ear, Nose & Throat Monthly **3**:453 (Sept.) 1924.

Dahmer [86] has preferred a broad opening, following a method by Glasscheib, with insignificant modifications, since 1902, when he described it as a partial and retrograde Boenninghaus operation. He emphasizes the necessity for placing the opening in an antrum operation as far forward as possible, making a curved incision in front of the insertion of the middle turbinate forward to the middle of the nasal floor and chiselling away as much as possible of the nasal antral wall to the edge of the piriform aperture. He also removes the anterior portion of the middle turbinate and attempts to create a smooth transition of the floor of the nose into the antrum, so as to achieve a smooth adaptation by means of the implanted mucosal flap.

Finding roentgenograms of little or no value, Welty [87] prefers the probe puncture for diagnostic purposes, repeating it daily if necessary, depending on the character of the discharge. He has modified the Caldwell-Luc operation and claims marked success for his method.

Ruskin [88] facilitates puncture of the maxillary sinus by a needle constructed on the basis of the anatomy of the nose. At a point 5 cm. from the tip is a mark which indicates the average distance of the processus maxillaris from the anterior nasal spine, which serves as a guide to the depth for those who are not experienced.

Spielberg [89] has a new instrument, which has a diameter of 4 mm. and a length of 105 mm., somewhat similar to a cystoscope except that it is straight. This antroscope, as it is called, may be passed into a cannula in the antrum.

Koenigstein [90] discusses complications after radical treatment of maxillary sinus suppuration. If the oral mucosa is incised too low, the wound margins are hard to adapt. When sensory nerve fibers are imbedded in the cicatrization, disagreeable parasthetic sensations may occur. A sharp margin in removal of the anterior wall of the maxillary sinus causes stinging pains for a long time. Careful operation with a curet is necessary in the recessus lacrimalis in order to avoid inflammation of the lacrimal sac. All septum deviations should be removed before the operation, otherwise a synechia between the septum and medial wall of the maxillary sinus may occur. A single case of follicular angina occurred after 300 operations. Postoperative edema occurred after a strong upward pulling of the soft parts and a tight tamponing of the sinus. An extensive hemorrhage may occur and postoperative fetor may result from the splinters of the bone sequestrums and degenerating blood clot which may remain.

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86. Dahmer: Ztschr. f. Hals-, Nasen- u. Ohrenh. **7**:444 (April) 1924.
87. Welty, Cullen F.: California & West. Med. **22**:624 (Dec.) 1924.
88. Ruskin, Simon L.: Laryngoscope **34**:179 (March) 1924.
89. Spielberg, W.: Laryngoscope **33**:844, 1924.
90. Koenigstein, M.: Polski przeglad oto-laryngol. **1**:25, 1924.

Leicher [91] holds that disinfection of the wound cavity is desirable in the open after-treatment of wounds following operations on the antrum, for he finds that cicatricial recurrences and fistula formations may be traced to the continuance of infection.

For the relief of antral fistulas, after removal, Drury [92] advocates first, sterilization of the fistulous trace with mercurochrome-220 soluble, then inducing closure by applications of liquor epispasticus (cantharides liniment), care being taken not to touch the neighboring parts and produce unnecessary blistering. Frequency of application depends on the reaction obtained but usually the treatment can be repeated daily and the aperture gradually closes.

Sheehan [93] uses skin grafts placed on the bony wall of the antrum after opening it. The same writer described an operation to release the duct of the parotid gland which had become embedded in the healing scar after operation on the empyema of the antrum.

The teeth's relation to the maxillary sinus have been widely discussed. Among others, the following may be mentioned:

Vandeput [94] reports a case in which two molar teeth were included in the maxillary sinus causing suspicion of a malignant tumor.

Bonnet-Roy [95] emphasizes the difference between empyema of the maxillary sinus caused by the rupture of an abscess at the root of a tooth in the antrum and sinusitis maxillaris from nasal causes.

Cipes [96] holds that in the treatment of maxillary sinus diseases, the rhinologist often fails to consider the oral etiologic factors. This particularly requires the services of a well trained dentist. A thorough mouth examination is necessary in every case of antrum disease. The fullest cooperation between the dentist and physician is necessary.

Johnson [97] likewise suggests that every patient suffering from any variety of degenerative disease should, even in the absence of suggestive symptoms, be subject to a thorough examination of the paranasal sinuses with particular attention to the teeth and antrums and that close cooperation between oral surgeon, rhinologist and roentgenologist be effected, if any clear conception of the pathology is to be expected from a study of the plate.

Kompanejetz [98] reports cases of empyema of the maxillary antrum of dental origin which lead to necrosis of the facial wall and rupture externally.

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91. Leicher, Hans: Ztschr. f. Hals-, Nasen- u. Ohrenh. **6**:361, 1924.
92. Drury, Dana W.: Boston M. & S. J. **191**:1123 (Dec.) 1924.
93. Sheehan, J. Eastman: Arch. internat. de laryngol., etc. **30**:264 (March) 1924; ibid., J. M. Soc. New Jersey **21**:361 (Nov.) 1924.
94. Vandeput, E.: Scalpel **77**:353, 1924.
95. Bonnet-Roy, F.: Footnote 81..
96. Cipes, Bernard J.: M. J. & Rec. **120**:582 (Dec.) 1924.
97. Johnson, Redford K.: J. Opthal., Otol. & Laryngol. **28**:182 (May) 1924.
98. Kompanejetz, S.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **9**:1 (Sept.) 1924.

Drury's [99] treatment of fistulas in the antrum has been referred to in the foregoing.

OCULAR COMPLICATIONS

The ocular complications of sinus disease have occupied a greater part of the otolaryngologic literature of 1924 than any other department. While nothing conclusive has been determined, it is obvious that the studies are becoming more intensive.

Vanderhoof,[100] Henkes,[101] and Negrie [102] have investigated the infectious orbital complications. In Vanderhoof's case an orbital infection secondary to ethmoid disease yielded to exenteration of the ethmoid cells. Henkes succeeded in preventing a threatening rupture of infected ethmoid cells into the orbit by endonasal curettment of the ethmoid bone.

Negrie reports a case of rupture with fistula formation from the maxillary sinus into the orbit in the region of the lacrimal sac, and one in which there was an external fistula with swelling of the eyelid and exophthalmos, also conjunctivitis, papillitis, reduction of vision, all of which disappeared on treatment of the accessory sinuses.

In Stitzel's[103] case of iridocyclitis with involvement of the uveal tract, symptoms occurred in connection with an acute sinusitis and ethmoid cell inflammation. The symptoms recurred yearly.

Macfarlan [104] lists the following visual vagaries which occur in sinus disease: visual confusion, floating specks, flashes of light, form or color and after-images. He also finds transitory symptoms of muscle imbalance causing diplopia and long standing spells of poor vision or attacks of eye strain.

One of the most interesting papers published during the year is that of Sattler,[105] who analyzed cases of motility disturbances of the muscles of the eye caused by sinus operations. He had at his disposal fourteen cases of lesions of the trochlear nerve, among them thirteen after frontal sinus operations and one after ethmoid operation, also two of lesions of the rectus inferior. In most of the cases Ritter's operation has been performed. Of special interest is the lesion of the trochlear nerve after separation in frontal sinus operations.

In typical paralysis of the trochlear nerve, the difference in height of the two double pictures increases in adduction when looking down; in raising the eye the adduction decreases; the opposite is the rule after frontal sinus operation in connection with the superior oblique after

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99. Drury, Dana W.: Footnote 92.
100. Vanderhoof, D. A.: Ann. Otol., Rhinol. & Laryngol. **33**:481 (June 1924.
101. Henkes, I. C.: Geneesk. gids. **2**:27, 1924.
102. Negrie: Rev. de laryngol., d'otol. et de rhinol. **45**:296, 1924.
103. Stitzel, J. W.: J. Ophthal., Otol. & Laryngol. **28**:19, 1924.
104. Macfarlan, D.: J. Ophthal., Otol. & Laryngol. **28**:119, 1924.
105. Sattler, C. H.: Ztschr. f. Augenh. **52**:57, 1924.

separation of the trochlear. This can be explained only by the fact that in the separation of the trochlear a decided relaxation of the tendon of the superior oblique is caused, whereby the inhibiting action of it on the inferior oblique is eliminated and the latter shows hyperfunction. The latter was always present in all fresh cases of lesions of the trochlear nerve after frontal sinus operations. In two cases it disappeared slowly after duration of several months. In cases examined after paralysis lasting from one to five years, there was no hyperfunction of the inferior oblique and therefore no differentiation from the picture of ordinary trochlear paralysis was shown. Perhaps with increasing cicatrization an inhibition of hyperfunction finally results.

In regard to prognosis, temporary double vision in fatigue still existed, in four cases of the eleven which were considered, one half to five years after. A distinct analysis of the disappearance of the double vision has probably not been made thus far. Of the seven cases of the author, in which the double vision was not a disturbing factor any more after one-fourth to one-half of a year, only two patients completely recovered. In three cases the primary position of the pictures fused, but in adduction of the paralyzed eye double pictures with different distances of height still occurred. They were not disturbing because the patients had learned to use only one part of the field of vision in which they had single vision. In two cases, also in primary position, pictures of different heights showed. Here the patients had learned how to suppress one of the pictures. In the patients who still complained of temporary disturbance of vision they had no inclination to suppress the one picture. Affections of the muscles of the eye, after ethmoid operative lesions and after irrigation of the maxillary sinus, were relieved in a few weeks or months with complete restoration of the function. The author recommends the preservation of the trochlear as much as possible in all operations, at least it should be separated only in connection with the periosteum.

Ohm [106] calls attention to the occurrence of trochlear paralysis after operation on the frontal sinus. One patient was lost sight of. A second one suffered from diplopia without any particular inconvenience. In the third case, removal was effected by tenotomy with backward displacement of the right inferior rectus.

Baratoux [107] points out that impaired vision may result from catarrhal inflammation as well as from suppurative conditions of the paranasal cavities. The diagnosis of latent paranasal sinus infection can often be made by exclusion.

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106. Ohm, J.: Acta Otolaryngol. **6**:145, 1924.
107. Baratoux, J.: Clin. ophth. **13**:253, 309, 380, 1924.

If the infection comes from the sphenoid, according to Cary,[108] disturbance of motility of the extra-ocular muscles is unlikely to occur; a lesion in the ethmoid cells is probable when there is evidence of orbital cellulitis with immobility of the extra-ocular muscles.

Dawson[109] reports four cases in which ocular defects were found as follows:

1. General edema and turbidity of each retina suggesting septic absorption. The middle turbinates were large; these were removed and some ethmoid cells were opened. No pus was seen. Improvement was rapid.

2. Choroiditis for four years, with spots appearing at intervals so that the patient became nearly blind in the left eye. The Wassermann test was negative. The ethmoids were found diseased, soft and easily broken down. After a few weeks the eye trouble disappeared.

3. The optic disk was pale, with proptosis and slight conjunctivitis with swelling of the left eye. The patient was unable to distinguish light from darkness. The ethmoid was exposed by external incision. A large hole three-fourth inch in diameter was found in the os planum, but no pus was seen. The ethmoids were cleared out and the sphenoidal sinus was opened. No recovery of sight occurred.

4. Optic neuritis in each eye. The right disk was indistinct and pale; the left showed marked papillitis. The elevation was from 1 to ½ diopters. Beyond a slight deviation of the septum, the nose appeared normal. No pus was found. The septum was resected; the posterior ethmoid region was of a uniform dark plum color. The following day the patient could see quite well. In four weeks her vision was normal. The sphenoid sinuses were opened but appeared healthy.

Crane[110] secured improvement of vision following complete exenteration of the spheno-ethmoid cell area. In several instances optic neuritis had been diagnosed.

Aloin[111] reports a case of retrobulbar neuritis with chronic sphenoid sinus suppuration.

White[112] reports forty cases of optic nerve disturbance from sinus disease which he had studied.

Fraser,[113] although advising against promiscuous operation on the sphenoid, states that he is willing to open up the sphenoid, even if the nose appears normal on anterior and posterior rhinoscopy, if the

108. Cary, E. H.: Texas State J. M. **19**:675 (April) 1924.
109. Dawson, G. W.: Lancet **2**:318 (Aug.) 1924.
110. Crane, C. G.: Laryngoscope **34**:174 (March) 1924.
111. Aloin, H.: Ann. des mal. de l'oreille, etc. **43**:68, 1924.
112. White, L. E.: Laryngoscope **34**:135 (Feb.) 1924.
113. Fraser, J. S.: J. Laryngol. & Otol. **39**:393 (July) 1924.

ophthalmologist feels that a serious ocular condition is due to a sinus infection. His view is that sphenoidal sinusitis is uncommon.

Baldenweck [114] reports seven cases of retrobulbar neuritis which differ in their course as well as in their method of treatment. The small number of cases and the diversity of the courses of treatment—recovery with and without operation—deleterious course with and without operation—is not disposed, as he admits, to help the solution of the question.

Benoit [115] reports two cases of retrobulbar neuritis with slight inflammatory changes of the papilla. In both, epinephrin applications to the nose was followed by some improvement. External operation was followed by recovery. For this reason the author recommends the diagnostic application of epinephrin. In the discussion of this paper, Wecker reports seven cases absolutely uninfluenced by operation, while Leplat believes that a moderate hemorrhage of the nose is sometimes sufficient to cause recovery.

Bourguet,[116] viewing the situation from the standpoint of an oculist, is strongly opposed to endonasal operations in retrobulbar neuritis when no suppurative affections of the paranasal cavities exist. Retrobulbar neuritis has a tendency to recede spontaneously in most cases either with complete visual acuity or with a minimal loss. Operation cannot be of any value in those cases in which the course of the visual acuity is not to improve. Cases in which the operation is followed by return of visual acuity and when the nasal findings are negative, justify doubt as to the value of the operations as a cause for the improvement and rapid recovery.

Canuyt and Terracol [117] hold that the ophthalmologist must consult the rhinologist when a retrobulbar optic neuritis is thought to be due to paranasal sinus disease.

In a case presenting papillary atrophy and bilateral reduction of vision, narrowing of the visual field and total absence of color perception for red and green and visual disturbance continuing for two years, Casadesus,[118] in spite of negative roentgenograms and other examinations, operated on the sphenoid sinus by the Hirsch interseptal method with Segura technic, with recovery following after some months.

Chaillous [119] reports patients with acute retrobulbar neuritis who recovered spontaneously without operation.

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114. Baldenweck, L.: Arch. internat. de laryngol., etc. **30**:403, 1924; ibid., Rev. d. 'Oto-neuro-ocul. **2**:161, 1924.
115. Benoit, Albert: Ann. Soc. méd.-chir. de Liege **58**:69, 1924.
116. Bourguet, Julien: Oto-rhino-laryngol. internat. **8**:193, 1924.
117. Canuyt, G., and Terracol, J.: Jetziger stand der frage, Med. **18**:129, 1924.
118. Casadesus, F.: Arch. de oftal. hispano-am. **24**:654 (Dec.) 1924.
119. Chaillous, J.: Ann. d'oculist. **161**:106, 1924.

Coulet [120] reports twelve cases covering a fairly wide range relieved by operation on the paranasal sinuses; four of these presented the sphenopalatine syndrome.

Demaria [121] reports a case of retrobulbar neuritis following an attack of grip four weeks previously. The Wassermann reaction was positive but although mercury was administered there was progressive exacerbation to amaurosis of the left eye. No pus was found on curettment of the ethmoid cells. Four days later the sphenoid sinus was opened by the perseptal method. Mucopus was found on the right side and swollen mucosa on the left side. Complete recovery followed in six weeks. Demaria prefers the Hirsch-Segura method.

Sutherland [122] presented a single case of retrobulbar and intraocular neuritis in which operation was followed by recovery. Only hyperplastic changes were found.

Portmann and Pesme [123] discuss a case of retrobulbar optic neuritis in which there were moderate positive findings. The patient recovered completely after conservative treatment with cocain epinephrin salve. The writers conclude that, in cases of this kind, the operation acts only in the way of a local drawing of blood and the recovery is caused by the airing and draining of the posterior ethmoid and sphenoid sinuses, which show little or no pathologic changes. They also report two cases in which the retrobulbar neuritis was caused by ethmoiditis and sphenoiditis. They found in both cases a combination of central scotoma and bilateral papillitis, indistinct contour and congested veins. In both cases the symptoms slowly receded.

Rendon [124] has had most acceptable results from the Hirsch-Segura operation in these cases. Roberts [125] favors an exploratory operation in all obscure cases of blindness of suspected nasal origin.

Sargnon [126] reports two additional cases in which relief followed operation on the middle turbinate. In another paper he expresses himself as considering the drainage and aeration of the ethmoid and sphenoid sinuses as most important for the relief of these conditions.

Stella [127] advises against the perseptal method of operating on the sphenoid which does not include the ethmoid bone. He feels that when the sphenoid is affected the ethmoid must also be included in the process.

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120. Coulet, G.: Rev. de laryngol., etc. **45**:256 (April) 1924.
121. Demaria, Enrique: Arch. de oftal. hispano-am. **24**:113, 1924.
122. Sutherland, J. M.: J. Michigan M. S. **23**:279 (July) 1924.
123. Portmann, G., and Pesme, Paul: Rev. de laryngol., d'otol et de rhinol. **45**:13, 1924, and **45**:289, 1924.
124. Rendon, F. E.: An. soc. med-quirurg. del Guayas **3**, 1924.
125. Roberts, W. H.: Arch. Ophthal. **53**:19, 1924.
126. Sargnon: Arch. internat. de laryngol., etc. **3**:436, 1924; ibid., J. de med. de Lyon **5**:263, 1924.
127. Stella, De: Arch. internat. de laryngol., etc. **3**:161, 1924.

Vinsonneau,[128] discussing the relation of functional diseases of the optic nerve and lesions of the ethmoid and sphenoid sinuses, mentions two conditions which may cause ocular disturbances: (1) hypertrophic rhinitis in the adult producing troubles in relation to accommodation and (2) congestion of the ethmoid and sphenoid sinuses following influenza, resulting in retraction of the visual field.

Zobel[129] reports a case of chronic retrobulbar neuritis which had persisted for six months and then rapidly increased. Vision was improved after exenteration of polypi and operation on the ethmoid cells.

CYSTS

Mucoceles of the ethmoid have been reported by Hajek,[130] who released a large amount of coffee brown fluid when he opened the ethmoid cells; by Portmann and Teulieres,[131] following an injury to the head; by Howarth,[132] due to a large osteoma; by Proby[133] and by Harrison.[134].

Bower[135] reports a case in which there was proptosis of the right eye. When the Killian operation was performed, a bluish, encapsulated, fluctuating mass was found occupying the inner portion of the orbit.

Safranek[136] reports a case of pyocele of the frontal sinus. A tumor which had been growing for years and was fluctuating in the inner angle of the eye of a patient, aged 15 years, caused proptosis and diplopia. Puncture yielded virulent pus. The roentgenogram showed a shadow in the orbit of the frontal sinus and ethmoid bone. The extranasal operation uncovered destruction of the orbital wall, a defect in the cerebral wall of the frontal sinus and superficial ulceration of the lamina papyracea. The protruding sac was the continuation of the mucosa of the frontal sinus. Recovery followed cleaning and broadening the connection of the nasal cavity.

Guttlich[137] demonstrated a tumor the size of a small apple which had been removed from the maxillary sinus of a boy, aged 14, which proved to be a follicular dental cyst based on a psammous endothelial sarcoma.

Blohmke[138] discusses the declining attitude of dental therapeutics in the operative treatment of maxillary cysts. Partsch's operation is only

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128. Vinsonneau, C.: Arch. d'opht. **41**:679, 1924.
129. Zobel, George: Ztschr. f. Augenheil. **52**:176, 1924.
130. Hajek, M.: Monatschr. f. Ohrenh. **58**:389 (May) 1924.
131. Portmann and Teulieres, M.: J. de med. de Bordeaux **54**:379, 1924.
132. Howarth, W. G.: J. Laryngol. & Otol. **39**:265 (May) 1924.
133. Proby: Lyon méd. **13**:498, 1924.
134. Harrison, W. J.: J. Laryngol. & Otol. **39**:20 (Jan.) 1924.
135. Bower, R. L.: Am. J. Ophth. **7**:218 (March) 1924.
136. Safranek, J.: Klin. Wchnschr. **3**:809, 1924.
137. Guttlich: Ztschr. f. Hals-, Nasen- u. Ohrenh. **6**:435, 1924.
138. Blohmke: Footnote 80.

suggested for small and medium size large cysts and in those cases in which the cyst does not lie in the neighborhood of other important regions. In larger cavities in which the avoidance of danger of infection cannot always be assured, the healing process cannot succeed under a crust composed of blood.

BENIGN TUMORS

A number of osteomas have been reported. Lee [139] had a patient in whom examination revealed a slightly tender tumor the size of a small cherry pushing through the upper, inner and under margin of the orbit. When the tumor was removed with rongeur and curet, it was found that the tumor had eroded the wall, the dura being exposed for an area about 100 mm. square.

Piazza [140] cites a case in which the rapidity of the development suggested an acute mucocele or a subacute empyema. An attempt to open the sinus by the Citelli method revealed the presence of the osteoma.

Moller [141] writes of a case of multiple exostosis of the paranasal cavities, in which four single masses were removed from the frontal sinus.

Vulowitsch [142] had three cases. In the first case there was a history of trauma. In the second case the nasal obstruction was preceded by suppuration of the sinus and except for displacement of the eyeball, there were no symptoms of osteoma. The tumor was the size of a small apple. In the third case the tumor arose from the posterior part of the interfrontal septum.

Lambert [143] gives the history of a case in which there were semispherical tumors consisting of compact bone; he believed this to be a case of atypical acromegalia.

Esch [144] reports a second case of adamantinoma similar to a case which he had reported some time previously. He considers the origin to be an oral diverticulum, the primary focus being a displaced embryonic epithelial remnant.

Torrigiani[145] presented a case of enchondroma of the sphenoid sinus, with an oculohypophyseal syndrome which he thought originated from the cartilagenous formations on the intersphenoid septum.

Got [146] discusses two interesting cases of polypi of the maxillary sinus, in one of which the sinus was filled by the polypi although none was visible in the nasal fossa.

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139. Lee, F. H.: Virginia M. Month. **51**:403 (Oct.) 1924.
140. Piazza, A.: Arch. internat. de laryngol. **30**:318 (March) 1924.
141. Moller: Folia Otolaryngol. **23**:40, 1924.
142. Vulowitsch, L.: Monatschr. f. Ohrenh. **58**:869 (Oct.) 1924.
143. Lambert: Arch. méd. belges **77**:27, 1924.
144. Esch, A.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **7**:404, 1924.
145. Torrigiani, C. A.: Riv. oto-neuro-oft. **50**:265, 1924.
146. Got, A.: Rev. de laryngol., etc. **45**:41 (Jan.) 1924.

Halphen and Raoul [147] report a case of giant cystic polyp of the maxillary sinus which at first was taken to be a large dental cyst.

MALIGNANT TUMORS

Blum [148] reports a case of primary sarcoma of the antrum; Fietta,[149] a case of a retrobulbar carcinoma originating probably from the maxillary sinus; Russi,[150] a malignant adenoma of the ethmoid cells; Lortat and Legrain,[151] a multiple osteosarcoma of the maxilla involving the cranium, and Peter [152] a case of sarcoma of the maxillary of rapid development.

Stevens,[153] Smith,[154] and Johnson [155] discuss the treatment by radium and roentgen rays of malignant growths of the paranasal sinuses. Stevens includes electrocoagulation and other methods. While admitting that he cannot give a hopeful report, he feels the method may be standardized from our present knowledge of radium, deep roentgen-ray therapy and electrocoagulation and that it should give promise of good results. He objects to removal of a portion of sarcoma for diagnostic purposes, but if deemed advisable a portion can be removed by electrocoagulation followed immediately by proper deep roentgen-ray therapy.

Smith holds that roentgen-ray treatment is much to be preferred to radium and that sarcomas are more easily relieved than carcinomas.

Johnson states that the successful application of radium depends on adequate exposure of the area.

INTRACRANIAL CONDITIONS

Linck [156] reports a case of bilateral inflammation of the frontal sinus and ethmoid cells following grip. After a duration of seven weeks, loss of consciousness occurred and symptoms of serous meningitis or cerebral abscess were present. On opening the anterior cranial fossa from the floor of the frontal sinus, the dura was found glossy and pulsating. Puncture of the right subdural space yielded a turbid milky fluid which was also taken from a puncture in the region of the right ventricle. Fine

147. Halphen, L., and Raoul, R.: Arch. internat. de laryngol., etc. **3**:445 (April) 1924.
148. Blum, Theodor: Radiology **3**:255 (Sept.) 1924.
149. Fietta, P.: Rev. gen. d'opht. **38**:86, 1924.
150. Russi, Pasquale: Arch. ital. di otol., etc. **35**:182, 1924.
151. Lortat, Jacob, and Legrain: Bull. Soc. franç. de dermat. et syph. **31**: 107, 1924.
152. Peter, Franz: Ztschr. f. Stomatol. **22**:42, 1924.
153. Stevens, Rollin H.: Am. J. Roentgenol. **11**:532 (June) 1924.
154. Smith, Lester A.: Am. J. Roentgenol. **12**:138, 1924.
155. Johnson, F. M.: Surg., Gynec. & Obst. **38**:819 (June) 1924.
156. Linck, E.: Ztschr. f. Hals-, Nasen- u. Ohrenh. **7**:129, 1924.

granulations were found on the pia after splitting open the dural sac. The patient recovered.

Berry [157] had two cases of brain abscess of paranasal sinus origin. In one, the abscess was in the middle fossa near the optic chiasm. The process started from the sphenoid, on the roof of which a dehiscence was found. A second case was an abscess of the left frontal lobe which was entered three weeks after an ethmoid operation in an endeavor to punch away some granulation tissue which was crowding down from above. Death occurred four years later and a large frontal lobe abscess was found at necropsy.

Goris [158] reports a case of frontal sinusitis complicated by extradural abscess and osteomyelitis following an acute attack three weeks before. Eight successive abscesses were found, which were opened and irrigated.

In the practice of Cornell,[159] a boy, aged 7 years, had a sudden attack of fever, pulsating exophthalmos and papillitis of the right optic nerve. The roentgenogram showed a shadow in the right frontal sinus and right ethmoid labyrinth. Under ether, the ethmoid bone was curetted and the foramen leading to the right frontal sinus was enlarged. Some improvement followed but a relapse soon occurred. Lumbar puncture showed 29,000 cells, with *Staphylococcus albus* in culture. The frontal sinus was opened from without, the dura was split and the pus drained. This pus also showed *Staphylococcus albus*. In five weeks the cerebral spinal fluid was clear but there was a cerebral hernia. This was removed and recovery followed.

FOREIGN BODIES

Bilancioni,[160] referred to in the foregoing, reports a case of cherry stone being removed from a patient's nose, which caused symptoms of chronic purulent frontal ethmoid sinusitis.

Levy and Leyda [161] discuss foreign bodies found in the paranasal sinuses in civil practice as a result of gunshot wounds, direct violence, explositions, eruption of loose teeth or accidents during surgical procedures from the breaking off of instruments and failure to remove gauze from the sinus after operation.

In a case of maxillary sinusitis, Gamaleia [162] found the cause to be a splinter of bullet in which the lesion occurred in 1917.

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157. Berry, G.: Laryngoscope **34**:346 (May) 1924.

158. Goris, C.: Ann. de l'Inst. chir. de Brux. **25**:136, 1924; ibid., Bull. d'otorhinolaryngol. **22**:232 (Nov.) 1924.

159. Cornell, W. P.: South. M. J. **17**:116 (Feb.) 1924.

160. Bilancioni, G.: Arch. Ital. di laryngol. **44**:5, 1924.

161. Levy, R., and Leyda, J. H.: Ann. Otol., Rhinol. & Laryngol. **33**:772 (Sept.) 1924.

162. Gamaleia: Rev. de laryngol., d'otol. et de rhinol. **45**:406, 1924.

CHILDREN AND PARANASAL SINUS DISEASE

Dean [163] has continued his studies on the paranasal sinus diseases in infants and in young children. He considers climate as important and diet as the next most important therapeutic factor. Diet alone cannot relieve a child of parnasal sinus infection. The source of infection must first be removed and then a proper dietary regimen instituted. Excepting for babies, the diet should contain a fairly liberal amount of butter, vegetables, fruits, milk, eggs and cereal foods, all fats, as far as possible, being supplied in the form of butter or cream. Carbohydrate food should be limited and cod liver oil given once or twice a day. Proper nutrition plays an important part in the prophylaxis of focal infection, as the writer's experience indicates that infants and children who are poorly nourished are most subject to nasal sinus disease. In children the tonsils and adenoids must be removed, 80 per cent. of the condition occurring in young infants and children being relieved by this procedure without any other treatment. With the exception of securing ample meatal drainage, no operation is done on the sinuses until months of treatment have been tried and until it is evident that further steps must be taken. The writer exenterates the ethmoid and sphenoid in young children if it is perfectly plain that the infection cannot be removed by any other method or that the child will be blind or crippled for life. He has gone no further than to do an antromeatal operation for a maxillary sinusitis in a child.

Avery [164] investigated the incidents of paranasal sinus infection, finding that out of 100 school children whose adenoids and tonsils had been removed, eighteen showed infection in one or both antrums. Infection of the sinus may be due to mechanical blocking by enlarged tonsils or adenoids, by direction extension or through lymphatic connection with Waldeyer's ring. He follows the procedure of Dean by washing out the maxillary sinus under ether anesthesia.

Allen [165] claims that routine roentgen-ray examination and treatment of the pathologic sinuses in children will obviate the necessity of lesions becoming chronic in adult life. Practically every case of sinusitis in children will become chronic if not properly treated.

Canuyt and Terracol [166] describe a new condition, forming and recurring nasal polypi of childhood, which they have found in seventy-five cases, occurring almost exclusively in adolescence and mainly in females. This has been referred to more extensively in the foregoing.

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163. Dean, L. W.: Laryngoscope **34**:30 (Jan.) 1924.
164. Avery, E. J.: New York State J. M. **24**:445 (March) 1924.
165. Allen, Bundy: Radiology **3**:136 (Aug.) 1924.
166. Canuyt, G., and Terracol, Jean: Arch. internat. de laryngol. **3**:143, 1924.

Siegmeister [167] reports five cases of ethmoiditis with orbital complication in children; Henkes [168] reports one in which there was suppuration of the orbit as a complication of ethmoiditis, which was relieved by endonasal curettage of the ethmoid bone.

Halphen, Jousseaume and Wisner [169] cite the case of a patient, a girl, aged 15 years, with frontal sinus abscess extending into the middle lobe. Safranek [170] reports one of pyocele of the frontal sinus in a girl, aged 15 years.

Ohm [171] reports a case of trochlear paralysis following frontal sinus operation in a child, aged 6 years.

Kettner [172] describes two cases in which there was an osteomyelitis of the upper jaw in infants, due to mechanical processes.

ROENTGENOGRAPHY

An unusual amount of work has been published concerning roentgenographic relations of the sinuses.

Shea [173] claims that the roentgenogram will show the persistent infantile sphenoido-ethmoid labyrinth, and Allen [174] insists that a routine roentgen-ray examination with treatment accordingly, will, in a large majority of cases, obviate the lesions becoming chronic.

Chantraine [175] calls attention to the sources of error in roentgenographic examinations of the paranasal sinuses. He states that unequal illumination of healthy frontal sinuses is said to be due to unequal effect of scattered rays and may be avoided by insertion of a 0.75 cm. luffa-sponge plate. Differences in illumination of maxillary sinuses without diseased conditions (oblique position of the head, unequal formation of the halves of the face) are avoided by films of the maxillary sinuses taken (within) from the mouth (same opinion as Moelke's). In this way the finding of small pus masses and polypi and operative proof are possible.

Claus [176] found in roentgenograms of acute diseases of the frontal and maxillary sinuses, made with the patient seated, a dark shadow limited by a sharply defined line which acts as a water level when the head is rotated and represents the level of the fluid.

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167. Siegmeister, W.: Laryngoscope **34**:717 (Sept.) 1924.
168. Henkes, I. C.: Geneesk. **2**:27, 1924.
169. Halphen, Jousseaume and Wisner: Arch. internat. de laryngol. **30**:568, 1924.
170. Safranek, J.: Klin. Wchnschr. **3**:809, 1924.
171. Ohm, J.: Acta Otolaryngol. **6**:145, 1924.
172. Kettner, A. H.: München. med. Wchnschr. **71**:207 (Feb. 15) 1924.
173. Shea, John J.: South. M. J. **17**:810 (Oct.) 1924.
174. Allen, Bundy: Radiology **3**:136 (Aug.) 1924.
175. Chantraine: Fortschr. a. d. Geb. d. Röntgenstrahlen. **32**:465, 1924; ibid., Zentralbl. f. Hals-, Nasen- u. Ohrenh. **6**:452.
176. Claus, George: Ztschr. f. Hals-, Nasen- u. Ohrenh. **10**:384 (Nov.) 1924.

Granger [177] calls attention to the so-called Granger line which is produced by that portion of the upper surface of the sphenoid bone called the optic groove. He claims that by studying this line and the subjacent area, he can determine whether or not the sphenoid sinus is diseased and when diseased to state, with a degree of accuracy heretofore impossible, that the sinus contains pus, polypi or hyperplastic tissue. This line must be studied carefully to note whether it is bilateral, whether it is clear, thicker and more distinct, thicker or less distinct, irregularily broken, hazy, so faint as to be hardly visible on one or both sides, whether it is absent on one or both sides and whether the subjacent region is slightly dense or very dense on one or both sides. Cases are reported in which the findings were confirmed.

Knox [178] contributed two interesting papers on cranial roentgenography, one referring to the sphenoid sinus and one to the maxillary sinus. He considers the best position for taking sphenoid pictures is the lateral, in practically the same position as when a sella turcica is to be roentgenographed. Stereoscopic negatives are of great value. The postero-anterior position is most acceptable, for it is possible to project the sphenoid sinuses in any aspect with the plate on the face and the tube behind, either above or below the antrum. However, the diagnostic value of the roentgenogram in the postero-anterior position is not very great. A third position, in which the film or plate is placed below the chin and the central ray is projected from above downward and forward, is available. If the patient is instructed to place the head as far forward as possible, it should be easy to get the chin nearly to the center of a 10 by 12 inch plate.

Concerning the maxillary pictures, it is important in taking lateral roentgenograms to place the head in the third position described for the antero-posterior roentgenogram of the skull. The underlying principle is an effort to obtain a standardization of the positions in the angles of the skull so that in a comparison of roentgenograms obtained in the lateral and the postero-anterior positions it may be possible to have points from which measurements may be made. The shapes of the structures in the roentgenogram vary with the position of the head and the angle from which the tube is centered. Inflammatory conditions give rise to a number of typical pictures, sometimes, however, difficult to recognize. The walls of the antrum are lined with mucosa which may become thickened by infection. If the pus is not drained, it gives rise to dense shadows which may obscure the detail of the surrounding bone. If the antrum contains a small amount of pus and a considerable amount

177. Granger, Amedee: Radiology **3**:208 (Sept.) 1924.

178. Knox, Robert: Brit. J. Radiol. **29**:92 (March) 1924; ibid. **29**:236 (July) 1924.

of air, changes in position will give a relative change in density. Polypoid projections give rise to a characteristic appearance.

Besser [179] holds that an ideal representation of the maxillary sinuses is one in which the superimposed bony structure can be excluded from the picture. According to Besser's method, the patient is placed on his back with the head tilted backward at an angle of 25 degrees. The side to be roentgenographed is placed on the plate, the tube is tilted to an angle of 60 degrees and the cone is brought downward and as near to the uppermost mandible as possible. This picture gives a direct line from the tube to the maxillary sinus with a minimum amount of soft tissue and no superimposed bony structure intervening.

Brunetti and Filippini [180] have made some studies on the use of opaque salts in roentgenograms of the antrum. The method which they use, and which they claim is harmless, is applied to the maxillary sinus as follows: (1) If the sinus opens outward by the natural orifice alone, injections of sterile potassium iodid (15 per cent.) through exploratory puncture of the maxilla; (2) in cases of sinus communicating externally through more or less wide openings of a pathologic nature, a mucilaginous suspension of barium sulphate, injected into the pathologic passage. To examine large cysts of the superior maxilla, they use sulphate of barium in mucilaginous suspension if the cyst communicates freely with the outside, thus making possible the subsequent perfect lavage of the cyst; the same opening is used to introduce the opaque substance. In closed cysts a 15 per cent. solution of potassium iodid is injected, taking care to replace the opaque fluid gradually with the iodid, with two needles acting in opposite directions, of which only one is attached to the syringe. Afterward, by the same technic, the iodid solution is replaced with sterile tepid water, on order to eliminate the endosmotic action of the hypertonic solution.

Maltz [181] uses the cassette with double screens elevated at an angle of 23 degrees. The patient's head is placed in such a position that the nose, both lips of the opened mouth, and the chin touch the plate in the center.

Gachot and Wohlhueter [182] have devised a plate carrier which can be introduced within the mouth. The uvula and pharynx must be anesthetized as for laryngoscopy. The device is tongue-shaped, since the carrier slides on the tongue. The patient's chin rests on a table or chairback, the anticathode being placed above the anterior part of the cranium, the posterior border of the localizing diaphragm corresponding

179. Besser, Herman: M. J. & Rec. Suppl. **120**:10 (July) 1924.
180. Brunetti, L., and Filippini, G.: Radiol. med. **11**:469 (Aug.) 1924.
181. Maltz, M.: Laryngoscope **34**:550, 1924.
182. Gachot, E., and Wohlhueter, G.: Presse méd. **32**:170 (Feb.) 1924.

with the mastoid line. The time of exposure varies with the age of the patient and density of the bones, but is only half that required for roentgenography of the frontal sinus in the same patient. The apparatus providing from 60 to 80 millamperes and a 15 cm. spark usually reduces the time to 0.5 second. The roentgenogram shows the sella turcica, sphenoid sinuses, ethmoid structures, nasal septum, turbinates and other elements of the local anatomy. Different parts may be developed by varying the angle of ray-inclination. The method is the best yet available for examining the sphenoidal and ethmoidal structures.

Aspray and Herpel [183] have followed the lines of investigation of Granger, Law, Grier and others. Their technic consists in taking six separate exposures on two 8 by 10 inch films and one small mouth film, using double screen, duplicated film technic and an average spark gap of about 4½ inches. On the upper half is taken an antero-posterior view of the anterior and posterior ethmoid cells and the sphenoids with the central ray directed upward at an angle of 10 degrees, centering on the glabella and with the ray passing through the superior portion of the sphenoid sinus.

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183. Aspray, J., and Herpel, Frederick K.: Am. J. Roentgenol. **12**:573 (Dec.) 1924.

Correspondence

SMALL PERFORATIONS OF THE NASAL SEPTUM AND MY METHOD OF TREATMENT

To the Editor:—On Feb. 10, 1922, I had the opportunity of operating, by a new method, on a young girl for an idiopathic perforation of the nasal septum. The following month, this patient was presented before the Montreal Medical Society, cured. I then wrote a paper giving my procedure, comparing it to the other methods, and the result I had obtained in this case, and sent it to Le Congrès de la Société Française d' oto-rhino-larynologie, Paris, in July, 1922. Later on, this work was published in full in French and English, in six different medical revues and transactions of societies. Nearly all were printed during the first half of the year 1923. (Perforation idiopathique de la cloison nasale. Autoplastie avec lambeau pédiculé de la muqueuse. Guérison. Bull. Soc. Franç. d' oto-rhino-laryngol. Congrès de 1922. Perforation idiopathique, etc., Rapport de L'Association des Médecins de langue française de l'Amérique du Nord, Congrès de 1922.)

I was much surprised to read in *The Laryngoscope* for September, 1923, a paper entitled: "A New Plastic Procedure for the Closure of Perforations of the Nasal Septum," by Dr. J. D. Lewis. This work was presented before the Minnesota Academy of Ophthalmology and Oto-Laryngology, in November, 1922, without stating clearly if the author had yet performed this operation on a patient. No mention was made of my article, though it had been published in: *Archives Internationales de Laryngologie, Otologie, Rhinologie et Broncho-Oesophagoscopie,* Paris, in February, 1923, in *l'Union Med. du Canada,* February, 1923, in *Revue de Laryngolgie, d' Otologie et de Rhinologie,* Bordeaux, Aug. 15, 1923, and in *Annals of Otology, Rhinology and Laryngology,* St. Louis, in June, 1923, that is to say, seven months, three months and one month, before his own work was printed in *The Laryngoscope.*

In reality, there is but little difference between my method and the one described by our colleague, and the principle of these new procedures is absolutely the same in both cases. The modifications brought up by Dr. Lewis are not liable to give more chance of success, and his technic is not as easy as mine. In order to allow a comparison, I shall quote what I have already written in the *Annals,* pages 555, 556 and 557:

"In the description of this method, we are supposing the patient is seated with the head tilted backward. When the perforation is low enough to make it possible to take a flap appropriated from the upper part of the nostril, it is necessary, after application of a strong solution of cocain and a submucous injection of procain epinephrin, to make an incision parallel to the nasal bone, varying between 2 and 3 cm. in length. This incision must touch the upper edge of the perforation and terminate near the opening of the nostril. A second rectilinear incision is made, starting from the posterior limit of the first, in the direction anterior to the floor of the nasal fossae, and passing 5 mm. from the inferior edge of the loss of the cartilaginous substance. The opening of the nostril is, in its turn, divided at the junction of the mucous membrane and the skin, and that section, which begins at the anterior part of the nasal floor, terminates on the same plan at the extremity of the vestibule. All the mucous membrane which is behind the perforation is taken away, and that

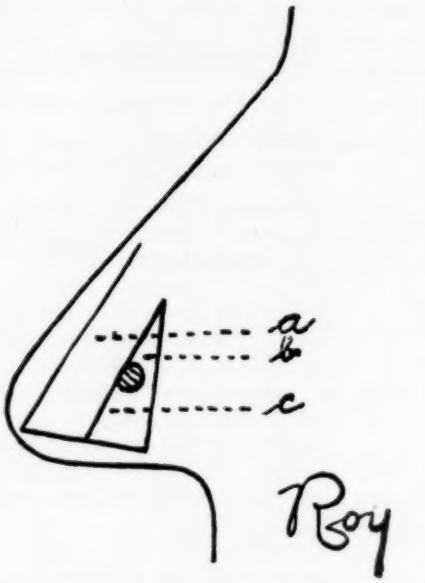

Fig. 1.—*a*, pedunculated flap; *b*, mucous membrane removed; *c*, mucous membrane partly detached and turned up to close the perforation.

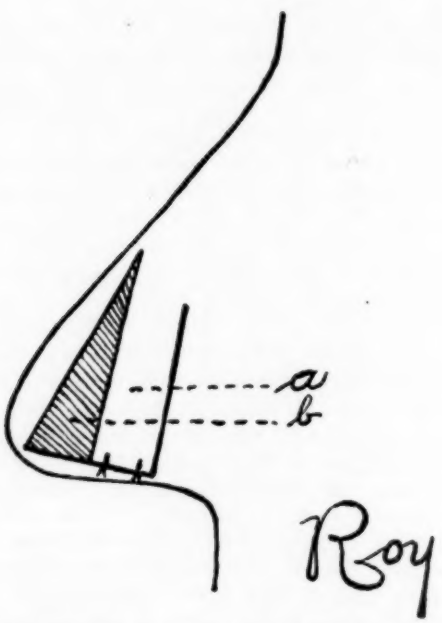

Fig. 2.—*a*, flap swung over to cover the perforation; *b*, denuded area.

which is in front is detached and turned back in such a way that it will close the opening of the septum. In affecting this maneuver one must be very careful to preserve, at that part of the mucous membrane, an attachment to the edge of the perforation in a manner that will give to it the best nutrition possible. A last incision of about 3 cm. is made at the upper limit of the nostril and parallel with the nasal bone, terminating at the vestibule. This pedunculated flap, which must be as large as circumstances will permit, is carefully detached and lowered, in order that the middle part may be opposite the perforation. Its raw surface is then in contact with the anterior piece of reverted mucous membrane which is also denuded, serving to close the loss of cartilaginous substance, and offering the best conditions of vitality which can possibly be desired. Finally the flap is sutured with silk to the lip of the incision of the opening of the nostril, or coapted by means of small Michel clips. One must always apply a sufficiently firm dressing, for it must not be forgotten that this intervention is made on a mucous membrane which is very susceptible to hemorrhage. However, thanks to the submucous injection of procain epinephrin, the operation is almost bloodless. If the perforation is found to be placed too high to make closure possible with a flap sufficiently large taken from the nasal bone, it may be taken from the lower part of the nasal fossae, transposing the method of operation.

"It also must not be forgotten that once cut, the flaps of mucous membrane slightly retract.

"The dressings must be made in an aseptic manner to hasten the healing of the uncovered part of the septum and to prevent the suppuration which exposes these flaps to mortification.

"This method is much simpler than the others while offering more chances of success. . . .

"With my method, coaptation of the flap is effected quite simply at the opening of the nostril, and all my incisions are rectilineal. Moreover, the phase of the operation which consists in turning back the mucous membrane of the anterior part of the perforation to close it, gives more stability to the flap which is applied on a denuded surface, and thus increases its vitality—something which is not possible in the other processes."

As no illustrations were given in my previous paper, I am giving two figures which demonstrate clearly the technic I have just fully described.

I should like to call attention especially to that phase of operation which consists in closing the perforation with the mucous membrane, covering the anterior surface of the perforation itself, detached as far as the edge, and turned up, as illustrated by *c* in Fig. 1, and described in the last paragraph dealing with the technic. It is well understood that if this membrane is a little too large for the closure of the perforation, a small part of it must be removed.

With this explanation, it will be easy to compare my method with the one described by Dr. Lewis in *The Laryngoscope*, September, 1923. The object of this letter is only to settle a question of priority in the description of a new procedure for the treatment of small perforations of the nasal septum.

J. N. Roy, M.D., Montreal, Canada.

News and Comment

LOCAL SOCIETY MEETINGS

PHILADELPHIA: Section on Otology and Laryngology of the College of Physicians of Philadelphia meets on the third Wednesday of each month from October to June, at 8:30 p. m., at the College of Physicians. Chairman, Dr. Fielding O. Lewis; Secretary, Dr. James A. Babbitt, 2117 Chestnut Street.

CLEVELAND: Ophthalmological and Otolaryngological Section of Cleveland Academy of Medicine meets on the fourth Friday of each month at the Winton Hotel. Chairman, Dr. E. W. Garrett; Secretary, Dr. M. Paul Motto, Rose Building.

CHICAGO: Chicago Laryngological and Otological Society meets on the first Monday of the month from October to May at the Crystal Room, Great Northern Hotel. Chairman, Dr. E. H. Norcross; Secretary, Dr. A. A. Hayden, 25 East Washington Street.

MILWAUKEE: Milwaukee Oto-Ophthalmic Society meets on the third Tuesday of the month, at the University Club, at 6:30 p. m. President, Dr. John E. Guy; Sec.-Treas., Dr. John J. Brooks, Majestic Building.

Abstracts from Current Literature

Ear

THE INFLUENCE OF ANESTHESIA OF PERIPHERAL NERVES ON PERIPHERAL AND CENTRAL PAST-POINTING. A. PRECECHTEL, J. Laryngol. & Otol. **40**:233 (April) 1925.

By-pointing is regarded as peripheral, when due to any alteration in the peripheral system of nerves, and central when it originates in the brain or in the cerebellum. Peripheral by-pointing can be induced by stimulation of the sensory nerves of the head, that is, of the trigeminus, the vestibular and the cervical nerves. In the case of an insensitive labyrinth, it is possible through caloric stimulation of the external auditory meatus to induce by-pointing and falling, which with different positions of the head is differently controlled by cervical reflexes. Peripheral deviations can be suppressed by unilateral anesthesia in the region of any sensory nerve of the head or neck, that is, the nasal mucosa, larynx and eye. The suppression is temporary, even if the anesthesia is continued. It is explained by diaschisis in the region of the nucleus of Deiter or other vestibular nuclei. By diaschisis is meant the fact that when one component of a complex which serves for a definite function has completely dropped out, the rest becomes temporarily disorganized. The correct pointing during diaschisis is contingent on the correct function of the cerebellorubrospinal tract. Peripheral anesthesia does not suppress central deviations. It is possible through asymmetrical anesthesia to induce by-pointing of the opposite arm. Latent or compensated central deviations can be made manifest by diaschisis in the region of the nucleus Deitersi.

IS LOCALIZATION OF SOUND A FUNCTION OF THE MEMBRANA TYMPANI AND OSSICLES? J. A. KEEN, J. Laryngol. & Otol. **40**:363 (June) 1925.

The author outlines the more common theories of sound localization taken from the textbooks of physiology. For the most part these theories are based on binaural localization. He then discusses Bonnier's theory which ascribes a localizing function to the membrana tympani. There is a slight lateral movement as well as the transverse movement which is transmitted through the ossicles to the saccular macula which Bonnier believes is the end-organ set apart for sound localization. The author attempts to show that localization is possible with one ear, and impossible in the absence of the membrana tympani and ossicles. For these experiments he used an alarm clock at a distance of six feet from the patient. Plasticine molded in one ear satisfactorily excluded the sound. He made a series of observations on normal cases with one and with both ears listening. He found that localization at best is very imperfect, but that with a little practice localization with one ear is quite good. He then tested a patient who had a radical mastoid done on the right ear, but who had preserved good hearing in both ears. The clock could be heard distinctly. His localization with both ears was nearly normal. With the left ear alone there were more wrong answers than normal, so it was concluded that the right ear in some way helped in localiza-

tion. But when the right ear alone was tested the boy was absolutely lost as to the direction of the sound. It invariably seemed to come from the right side. The fact that the boy localized better with both ears can only be explained by admitting binaural localization, which is the more usual method, but there is no doubt that each ear localized separately by a mechanism for which a reasonable explanation is given by Bonnier.

Pharynx

MALIGNANT TUMORS OF THE ESOPHAGUS. JEAN GUISEZ, J. Laryngol. & Otol. **40**:213 (April) 1925.

This paper is based on a series of 1,430 cases of cancer of the esophagus. The disease is more common in males between 55 and 65 years of age. The growth is more frequently situated in the middle third of the gullet. Esophagitis is the cause which excites the development of cancer and the chronic irritation is due to alcohol, spices, etc. Cicatricial stenosis or persistent spasm are frequently followed by cancer just above the constriction. Dysphagia is present in 98 per cent. of the cases. It is essentially a painless disease. Loss of weight is due to starvation. Cachexia is never marked. If nourishment can be taken, the patient often gains in weight. The complications are usually mediastinal involvement, tracheobronchial pressure, or fistula with pneumonia, involvement of the recurrent laryngeal, vagus and sympathetic nerves. The latent type of the disease is very insidious. There are a few cases of rapidly growing cancer in very young people. Carcinoma grafted on inflammatory stenosis is quite common. Sarcoma of the esophagus is rare. Secondary cancer of the esophagus is rare, multiple carcinomas of the esophagus are found occasionally. The most satisfactory method of examination is by esophagoscopy. A snipping should be taken from the growth for microscopic examination. The cancer is usually of the polypoid ulcerating, or the infiltration or submucous type. Cancer must be distinguished from simple spasm or stenosis or from external compression of the esophagus. The cancer, though only mildly malignant, kills through starvation. Surgical removal of the growth has proved rather unsatisfactory. The most encouraging results have been derived from radium and though only palliative, relief is often obtained for a period of months or years. If there is marked cachexia, or laryngeal paralysis, or spread to neighboring organs, or if the stenosis is impermeable, radium applications are not advisable. The results of gastrostomy are poor. Rubber intubation has been more satisfactoy. The soft rubber catheter is more comfortable, and less dangerous than the hard rubber.

BLEEDING IN TONSIL OPERATIONS. J. K. M. DICKIE, J. Laryngol. & Otol. **40**:243 (April) 1925.

The endeavor during a tonsillectomy should be to prevent the occurrence of bleeding, and to control bleeding when it has occurred. The operation should always be performed in a hospital where the best facilities are available, that is, proper light, suction apparatus, etc. The habit of arresting hemorrhage by the use of styptics and coagulants applied to the fossa must be banished. The only sane method of stopping bleeding is to clamp and ligature the bleeding vessel. A general anesthetic is preferable, because the reflexes are more in abeyance. When returned to bed, the patient is placed on his side, face downward, in order that any bleeding may be revealed.

Larynx

CONGENITAL LARYNGEAL STRIDOR WITH DYSPHAGIA. DAN MCKENZIE, J. Laryngol. & Otol. **40**:285 (May) 1925.

The author reports the case of a child, aged 3 years, admitted to hospital suffering from severe laryngeal stridor with dysphagia. The stridor dated from three weeks after birth. The dysphagia began at the age of 9 months. During sleep, the stridor was more marked, and the respiratory rate dropped to about 10 per minute. A tracheotomy was done for relief of stridor, but during sleep the low respiratory rate persisted. Two weeks after the tracheotomy was done, food was returned through the tracheotomy tube and two weeks later, the child died of pneumonia. The necropsy revealed a flaccid condition of the upper part of the larynx. The introitus laryngis was cruciform, due to the folded epiglottis and the approximated aryepiglottic folds. There was no fistula between the trachea and esophagus. Detailed histologic examination of the brain, medulla and cord was made, and no lesion was found.

The bradypnea is presumed to be an adaptation on the part of the nervous system to allow of sleep, otherwise with a normal rate, and under abnormal circumstances, sleep would be impossible. Thus the persistency of the low rate of respiration, after the tracheotomy was done, is a persistency of the habit.

In discussing the two most prevalent theories of the etiology of congenital laryngeal stridor, namely, (1) that it is due to a congenital malformation of the larynx, and partly due to the flaccidity of those parts in infants, and (2) that it is an acquired deformity due to an incoordinated spasmodic action of the muscles of respiration, the author considers only the abnormalities of the introitus and not those cases in which the cords are abnormal. If it were due to incoordination, it would be a sudden interference with inspiration such as hiccough. If it were due to closing of the laryngeal sphincter, there would be a suggestion of spasm, and asphyxia and unconsciousness would probably supervene.

The author suggests that instead of assuming congenital deformity or incoordination, it could be due to a poorly developed laryngeal vestibular wall, which is normal in conformation. Spontaneous cure would merely be a strengthening of the wall. The dysphagia appeared at nine months; this could be explained as due to the constant stretching of the flaccid vestibular wall and the muscles; the larynx could not be closed properly during deglutition, so food was aspirated. Before a tracheotomy is done the food will be expelled, but after tracheotomy the force of the air from coughing escapes through the tracheotomy tube, and the food gets to the lungs causing the pneumonia. The lesson to postpone tracheotomy as long as possible is obvious in these cases.

THE POSSIBILITY OF RESTORING MOVEMENT TO A PARALYZED VOCAL CORD BY NERVE ANASTOMOSIS. LIONEL COLLEDGE, Brit. M. J. **1**:547 (March 21) 1925.

Experiments were made by Colledge on the effects of an anastomosis of the recurrent laryngeal with another nerve, controlled by the use of the direct vision laryngoscope of Chevalier Jackson.

A nervous connection may be reestablished by a recurrent laryngeal vagus anastomosis, which permits of some movement of the cord during partial asphyxiation, but it is useless to expect a return of spontaneous movement in the corresponding vocal cord.

A nervous connection may be reestablished by an anastomosis with the descendens noni; but no spontaneous movement of the cord occurs, except possibly during swallowing, when an impulse would be traveling down the descendens; however, there was no means of observing this.

By anastomosis between the recurrent laryngeal and the phrenic nerves, spontaneous respiratory movements can be restored to the vocal cord. Part of the phrenic trunk is sufficient as in a lateral anastomosis.

McNALLY, Montreal.

Nose

ORBITAL COMPLICATIONS OF SINUSITIS. JAMES ALLEN PATTERSON, Ann. Otol., Rhinol. & Laryngol. **34**:226-230 (March) 1925.

Patterson reports five cases, two of which showed swelling of the eyelids which was directly due to suppurative nasal sinusitis. One patient had an orbital abscess. The fourth case reported was an obscure condition, in which there was paresis of the right inferior and internal rectus muscles as well as involvement of the right facial nerve. Shrinking of the nose brought away an enormous amount of mucopus from the right nostril. This patient was only seen once by the author.

The last case reported by Patterson was one of a woman, aged 68, who complained of an extremely painful right eye with slight proptosis. There was a history of a severe head cold. The optic nerve was round with a large cup and steep over-hanging edge. Vision was 6/9. Suction of the right nostril caused further considerable secretion. Following several weeks of treatment the pain ceased and the protrusion subsided. The nasal discharge continued and roentgenograms showed clouding of the right frontal sinus and antrum. Operation was decided on and the anterior end of the right middle turbinate was amputated with puncture and washing of the antrum from which the fluid returned clear. The nasofrontal duct could be explored and easily entered without resistance. Two days later meningitis developed from which the patient died.

RETROBULBAR NEURITIS ATTRIBUTED TO SINUS DISEASE; IMPROVEMENT FOLLOWING INTRANASAL SURGERY. REPORT OF A CASE. GEORGE L. WHELAN, Laryngoscope, **35**:430-435 (June) 1925.

Whelan reports a case of a woman, aged 23, with left optic neuritis. The history was that she had noticed pains over the left frontal and occipital regions for six weeks before examination.

The eye examination showed a marked enlargement of the blind spot and a large scotoma in the upper nasal quadrant. The color field was markedly cut.

Middle turbinectomy was performed. After this operation the field showed some slight improvement which was followed, however, by rapid increase in the blind area. A month later the posterior ethmoid cells were exenterated and the anterior sphenoid wall was punched out. Three months later the blind spot was still somewhat enlarged and there was a narrow relative scotoma extending upward and inward from the upper border. The color field showed a cut in the upper nasal quadrant. Nasal examination showed a curtain-like covering of mucous membrane over the anterior sphenoidal wall. This was removed without any change being noticed in the visual field.

Seven months after the last operation, examination showed that the blind spot was slightly enlarged. Two small absolute scotomas had replaced the

relative scotoma. The form field was full but the color field still showed a cut in the upper nasal quadrant.

Whelan states in regard to this case that it was of interest to note that with each fresh infection of the nose or when the patient was depressed or fatigued from loss of sleep, worry or the menstrual period, marked changes were observed in the field which always showed improvement after treatment and rest. He concluded that every case of retrobulbar or intra-ocular neuritis which does not show improvement under general or local treatment should be submitted to surgical treatment without further delay. Cooperation between the ophthalmologist and rhinologist after a roentgenographic examination has been made would seem to be the proper procedure in every case, regardless of the cause.

H. H. Vail, Cincinnati.

Meningitis of Nasal Origin. W. M. Mollison, Guy's Hosp. Rep. **75**:226 (April) 1925.

The author discusses the more common paths of infection of the meninges from the sinuses, through bone, venous spread, lymphatic spread or congenital defects. The cases are divided into two groups; nonoperative and operative. He quotes statistics from the literature for the different types of cases. Though the prognosis of postoperative meningitis is extremely bad, a few recoveries are reported. The best defense lies in taking all precautions against damage to the cribriform plate during operation and in observing strict asepsis.

McNally, Montreal.

Concerning the Relations of Trachoma to Nasal Disease and the Question of One Sided Trachoma. Areih Feigenbaum, Klin. Monatsbl. f. Augenh. **74**:391-403 (March-April) 1925.

Feigenbaum, reporting from Jerusalem, states that the connection between external ocular diseases and those of the nose is known but is generally not always sufficiently appreciated. The contrary is true, that there are orbital and optic nerve diseases as the result of sinus infections.

Kuhnt, in 1897, has shown this in an emphatic fashion. However, Kuhnt felt that it was the disease of the lacrimal passages which influenced unfavorably the course of trachoma but in connection with his findings of 65 per cent. of different nasal diseases among 443 cases of trachoma, it can hardly be a coincidence that there was such a collection of nasal disease with trachoma.

It was not until the spring of 1922, after a rhinologist had established himself in Jerusalem, that regular reliable nasal findings could be obtained in Feigenbaum's cases of trachoma.

The author has felt for some time that one-sided trachoma occurred often with one-sided nasal disease. He believes that bilateral cases of trachoma will heal on one side, while on the other side the complicated outcome is the result of nasal sinusitis. He states that the acceptance of a nasal etiology for trachoma cannot be held but it is that combination of trachoma with a nasal disease which we have to do with and which apparently complicates the trachoma. In consideration of material facts he felt that nasal disease on the same side was an unfavorable factor for trachoma.

The author reports statistics taken from his clinic. He divided his cases into groups showing the percentages of nasal pathologic changes in those with trachoma.

H. H. Vail, Cincinnati.

Miscellaneous

BRONCHOSCOPY IN THE TREATMENT OF ASTHMA. ROBERT M. LUKENS, Laryngoscope **35**:227, 1925.

The bronchoscope has proved to be a valuable aid in the diagnosis and treatment of asthma in the hands of Lukens, who reports a series of twenty-one cases treated in this way. Both general treatment and autogenous vaccines were administered in addition to the bronchoscopic treatment, so no conclusions can be drawn as to the value of the bronchoscopic treatment alone, but it is worthy of note that these general measures produced no results until bronchoscopic treatment was added. In this series, infection of the respiratory tract played an important part in defeating the cure of asthma by recognized medical measures and was greatly overcome by bronchoscopic methods. The greatest improvement seemed to be in those cases with a chronic suppurative tracheobronchitis, marked relief being obtained after cleaning out the thick purulent material from the tracheobronchial tree. The local treatment consisted, in addition to a thorough cleansing, in the application of a 10 per cent. solution of silver nitrate to the urticarial patches and inflamed areas found in some cases. Two and one-half cubic centimeters of "asthma solution" was instilled into each lower lobe bronchus. This solution consists of 20 drops of epinephrin hydrochlorid, 1:10,000 solution; 10 drops of cocain hydrochlorid, 10 per cent. solution; to 1 oz. of physiologic sodium chlorid solution. Preparations of menthol or guaiacol in mineral oil were also used. The number of bronchoscopies in each case varied from 2 to 16, and the duration of treatment from one week to fifteen months. Of the twenty-one patients treated, fourteen are reported as improved.

SNAPP, Grand Rapids, Mich.

A NOTE ON ASTHMA. J. R. CHARLES, Bristol M. Chir. J. **42**:84, 1925.

The author discusses the more commonly known causes of asthma and protein sensitization. He refers to a paper of Lapage and Adams, in which they stress the importance of intrathoracic pressure as a factor. The attacks may be most typical of spasmodic asthma. The case under consideration was that of a young man who suffered from typical nocturnal attacks of spasmodic asthma for years. He had derived benefit from change of climate. The attacks were becoming more frequent. He noticed a slight swelling of the thyroid behind the right clavicle. A roentgenogram showed a definite shadow in the right mediastinum which bent the trachea over to the left. This proved to be an intrathoracic adenoma of the thyroid into which recent hemorrhage had taken place. The tumor was successfully removed. No asthmatic attacks have occurred since. It is thought probable that the asthmatic attacks were caused by hemorrhage into the cyst following exertion. The example of this case is a plea for roentgen-ray examination in any case of asthma which has not responded to treatment.

NODAL FEVER (ERYTHEMA NODOSUM, ERYTHEMA MULTIFORME). ALFRED AUSTEN LENDON, Brit. M. J. **1**:651 (April 4) 1925.

The author calls attention to a book published in 1905 on this subject, in which he adduced evidence to show that erythema nodosum is an acute specific fever. The present paper is to bring forward fresh evidence. It is pointed out that erythema nodosum follows the typical course of acute specific fevers. There is a prodromal stage, a stage of eruption, and a stage of convalescence.

There are instances of second attacks as well as evidence of infection. The author is convinced that the separate elements of erythema multiforme are different only in outward form. The pseudorheumatism of nodal fever is an expression of arthritis or tenosynovitis due directly to the "germ" which causes the skin eruption, or to the toxins to which it may give rise. There are no cardiac complications of nodal fever. The proportion of tuberculous manifestations preceding nodal fever is not greater than one would expect, considering how widely spread tuberculosis is known to be.

AN ACCOUNT OF THE SHORT TUBE FOR THE TREATMENT OF STRICTURE OF THE ESOPHAGUS. CHARTERS SYMONDS, Guy's Hosp. Rep. **75**:141 (April) 1925.

The author gives an account of the origin of the short tube for treating stricture of the esophagus. At the suggestion of the author, it was designed by his assistant Campbell Gowan at Guy's Hospital about thirty years ago. With slight improvements, this type of tube is still in use. The most satisfactory tube is made of silk-web gum elastic in two lengths, 4 and 6 inches. The funnel is of uniform size but the tubes vary. A whalebone stilet is used to introduce the tube. There is a collar on the stilet that fits into and applies the pressure to the funnel, rather than to the tip of the tube. Silk thread is attached to the tube to facilitate removal. The tubes are most serviceable in diseases affecting the middle portion of the gullet. The danger of perforation of the growth during introduction is slight; never use force. The author believes that if advice is sought in the early stages, gastrotomy should not be required.

McNALLY, Montreal.

EXOPHTHALMOS FROM CHRONIC RETRO-ORBITAL ABSCESS OF DIFFICULT DIAGNOSIS. C. A. TORRIGIANI and G. PEREYRA, Riv. Oto-Neuro-Oftal. **2**:143-157 (March-April) 1925.

Torrigiani and Pereyra report a case of exophthalmos from chronic retro-orbital abscess. About nine years before the patient presented himself, he began to notice severe headaches and nervous disturbances of a nature not very precise. At times he felt melancholy and often noticed a feeling of heaviness in the head. About four months before he was first seen, the patient noticed that the gums of the left upper jaw were swollen and painful, and after some days there was a slight swelling of the left eyelid with reddening and protrusion of the left eyeball. After a few days there was an abundant discharge of foul pus from the nose and fifteen days later the eye had returned to a perfectly normal state.

In November, 1923, he noticed one morning that the left eye was protruding and reddened. On examination, November 6, the right eye was perfectly normal. The left eye showed moderate palpebral edema especially marked in the middle portion of the upper eyelid. The bulbar conjunctiva was edematous in the inferior portion and formed laterally a swollen area of chemosis. Enormous dilated blood vessels corresponding to the inferior internal portion of the conjunctiva were noticed. The eyeball, which protruded forward about 10 mm., was slightly depressed. There was a slight limitation in excursions of the eyeballs, otherwise the ocular movements were normal. With compression, the exophthalmos was reduced slightly. There was no pulsation, nor did the patient experience any pain on compression. The optic nerve head showed a slight hyperemia. Visual acuity was 6/10 and was not

increased by lenses. The visual field showed a reduction in the upper outer sector. The Wassermann reaction was negative.

The ocular condition grew steadily worse with increasing exophthalmos. Nasal examination showed marked deviation of the nasal septum toward the left. The nasal mucosa was normal on both sides. No pus was found in the olfactory recess after shrinking with epinephrin. Posterior rhinoscopy was negative.

Roentgenographic examination showed definite clouding of the right frontal sinus with the left frontal sinus being extremely bright. On the left side there was a slight haze of the maxillary sinus and the ethmoids. An axial roentgenogram of the posterior sinuses according to Kniek was made, but with uncertain results. Antrum puncture was negative.

Convinced that it was a case of nasal sinus infection, submucous resection of the septum was done, the left middle turbinate was removed, the ethmoid cells were opened widely and the ostium of the sphenoid was enlarged. The only pathologic change found was some thickened ethmoidal mucosa of grayish color, such as is found in slight chronic inflammation.

The following month the patient noticed abundant purulent discharge from the nose with decreasing exophthalmos, the patient then left the hospital.

Two months later he returned presenting such marked exophthalmos that the inferior half of the cornea remained exposed. The conjunctiva was intensely chemotic and formed a voluminous swelling of lozenge shape which spread over the lower lid. The optic nerve head was strongly congested. Another roentgenogram showed only slight clouding of the ethmoid cells. Another exploratory antrum puncture was negative. External intervention was decided on, and, under local anesthesia with a Killiam incision, removal of the inferior wall of the frontal sinus was done. Proceeding by the subperiosteal route, a large portion of the lamina papyricea was removed and in the deepest portion of the orbit was seen a stream of creamy pus localized in that part of the orbital cavity corresponding to the ethmoid. Drainage was instituted and in the following days the exophthalmos subsided little by little so that four months after the operation it had disappeared.

The cosmetic effect was excellent. Visual acuity was 6/10 with the fundus and the visual field normal. A short time after this patient was discharged, he returned complaining of pain in the left eye which, on examination, was found to be a form of neuroparalytic keratitis.

H. H. Vail, Cincinnati.

Concerning Leukoplakia of the Tongue and Its Carcinomatous Degeneration. Hans Czermak, Ztschr. f. Hals-, Nasen-u. Ohrenh. **11**:35 (March 14) 1925.

In 1914, Ribbert was mistaken when he declared that the artificial creation of cancer by inflammatory irritation did not occur. Czermak reports two cases of blastoma. The first patient, aged 67, had repeated attacks of gonorrhea, and once a soft chancre. He had smoked up to twenty cigars a day since he was 20 years old. Twenty-seven years ago he had noticed little vesicles on the tongue which had disappeared spontaneously. Ten years later, a whitish thickening of the mucosa developed at the margins of the tongue. This persisted. Since March 1919, a nodule was observed at the margin of the tongue. A horny, squamous celled epithelioma of an extremely benign clinical course was present, which had developed on the base of a leukoplakia in this man who had smoked excessively. The presence of syphilis was questionable. A

typical radical operation which had been indicated had been refused by the patient at that time. Three years later, energetic roentgenization in fractional doses was not satisfactory. As the pain increased, the temperature rose and the sublingual and submaxillary regions were swollen on both sides and caused pain. The whole diseased part of the tongue was removed far backward into healthy tissue, on Aug. 8, 1923. The inflammatory process receded. Ten days after the operation the patient could again speak plainly, and was discharged with a healed wound. One year later, the patient, who was then 68, was working hard and continuously in an office and felt excellent. The tongue was almost of normal shape, almost normally movable and could be pushed somewhat over the row of teeth. Speech was perfect. In the region of the tip, on the left side, was a bluish white discolored portion of the mucous membrane which was entirely soft and was also not felt by the patient to have changed. Neither in the depth nor on the surface a thickening or a nodule could be felt. The patient was entirely free from complaint and recurrence five and one-half years after the first appearance of the carcinoma. Of course a recurrence can be expected. The patient smokes considerably against orders, but of the primary leukoplakia nothing can be seen except a small bluish white entirely soft portion at the tip of the tongue.

The next case was a man, aged 56, who chewed much tobacco. He became syphilitic thirty-one years ago. One year afterward leukoplakia had been noticed. Three energetic antisyphilitic series of treatments were unsuccessful. At the spot where the patient used to chew tobacco a wart had formed years ago which remained unchanged since then. Examination, April 18, 1924, showed that an extensive leukokeratosis of the anterior portion of the tongue existed. It consisted partly of grayish white, callous portions which were rough to the touch like the tongue of an ox, and partly of white, shining cartilagelike spots, which were as hard as bone and possessed a mirrorlike surface. At the edge of a spot, about in the middle of the border of the tongue, a papillomatous growth about the size of a pea was found. Along both sternocleido-mastoid muscles, small indolent glands had been present, apparently for years. The papillomatous spot was excised ovally and wedgelike. An exploratory excision of a piece of the flat focus of cartilagelike appearance was made. The histologic examination revealed the formation of slender epithelial cones which had grown into the depth of the tongue, between the muscle fibers. They showed dichotomous processes of partition. The horny substance or the layer which was becoming horny had travelled with these cones into the depth. Here some cones were cut crosswise and showed, beyond a narrow germinating layer, large shining cells which changed more or less into concentrically arranged layers of prehorny cells. The innermost parts of these cell cones were partly softened and filled with detritus and immigrated leukocytes. Here the tissue appeared to be richly infiltrated with round cells and leukocytes. This infiltration reached far beyond the epithelial cones into the depth of the muscle. Even if it was an epithelial growth of well differentiated cells, the growth must be considered a carcinoma. The histologic examination of the second piece showed an increase of all epithelial layers in the region of the dissemination of the epithelium. Above all, a conspicuously broad horny layer was found, which covered the epithelium on the outside. A plain prehorny layer could also be noticed, with deposits of basophile granules. Where the epithelium was thin the horny layer was missing, and the stratum lucidum was only intimated. A stratum granulosum was present only in some spots. In the region where thickened epithelium was found the submucous tissue seemed changed. It was rich in blood vessels. The very fine blood and lymph vessels

showed the endothelium much swollen. These vessels were accompanied by loose tracts and inlays of a lymphocytic or plasma cellular nature. This could only be considered a keratosis of the tongue. It is interesting to note the short interval of one year between the primary lesion and the appearance of leukoplakia, whereas Baer mentions the shortest interval observed so far to be two years. Czermak will observe his patient very closely and if any suspicious change occurs in the region of the leukoplakia, he intends to extirpate the leukoplakia, unless metastases in the glands demand a more radical procedure. The glandular enlargements now present must be considered of a chronic inflammatory nature. One should be careful in judging glandular enlargements in the region of the neck, especially if the process developed on a chronic inflammatory basis.

Morestin considers leukoplakia a precancerous condition; Kopp regards it as the first phase of cancer. Czermak then discusses thoroughly the physiology of normal and pathologic processes of growths. He comes to the conclusion that in cases of this nature all irritations must be strictly avoided, exact hygiene of the teeth and mouth must be observed, each suspicious spot must be excised immediately and thoroughly, and the specimen must be examined histologically. If indications for energetic measures present themselves, Czermak recommends the radical operation as performed in this first patient if the extent and the limitation of the process permit it—not only the decortication but the wedgelike excision of the whole diseased portion of the tongue.

THE TREATMENT OF SYNECHIAS BY SURGICAL DIATHERMY. W. STUPKA, Ztschr. f. Hals-, Nasen-u. Ohrenh. **11**:57 (March 14) 1925.

Stupka recommends the surgical diathermy for treatment of synechias on account of the simplicity of the procedure. After mentioning the good results achieved also by others, beginning with Dan MacKenzie in 1915, the technic is given in detail.

CONCERNING THE DISEASE OF THE SO-CALLED CEPHALO-STATIC SYSTEM. KARL HELLMANN, Ztschr. f. Hals-, Nasen-u. Ohrenh. **11**:107 (March 14) 1925.

Since Bárány has called the attention of the investigators to diseases of the otolith apparatus and the respective nerve tracks, and since Voss, Schoenlack, Stein and Brunner have observed and published additional cases, a whole series of publications have appeared pertaining to the subject.

A case in point is reported by the author. A high school teacher was always somewhat vasolabile, yet his blood pressure was never high. When a student, he showed an idiosyncrasy against a certain kind of Tyrolian red wine. After a few swallows, epistaxis never failed to occur. Fifteen years ago, after correcting papers for hours, he partook of beer with his supper; he had a coughing spell and a small retinal hemorrhage occurred which was soon absorbed. Four weeks prior to examination, the patient climbed a mountain and suffered from severe sunburn. In the evening after drinking tea and beer, he again tried a small quantity of Tyrolian red wine. The next morning, the patient awoke toward 4 a. m., feeling nauseated and dizzy. The walls of the room appeared to him to be in motion. He was lying on his back, with his head turned to the left. When he turned his head to the median line the symptoms disappeared, except that a little nausea and dizziness persisted. Once again such an attack occurred during the night. The patient avoided the "position of dizziness" and suffered no more annoyance except for a little uncertainty while writing. In the dark the patient could walk well.

Examination: In the normal position of the body and head there was no nystagmus. The caloric test on the right side showed no nystagmus after 5 c.c. water of 80.6 F., in the optimum position of the head. When 5 c.c. water of 59 F. was used, a few twitchings of the eye toward the left side were noticed with the aid of Bartel's spectacles. The left ear was calorically normally excitable. After this ear was douched with cold water the spontaneous past pointing of the right arm changed from outward to inward. The post-turning nystagmus with the head slightly bent forward, after 5 rotations, lasted for from twenty-three to twenty-five seconds and was in a horizontal direction.

When the patient was lying on his back and the face pointed upward, no nystagmus and no dizziness occurred. When the body was kept in this position and the head was moved slowly to the left, the patient felt dizzy. This dizziness increased the more the head was turned to the side. When the head was turned as far as possible, a violent nystagmus to the right occurred. When the head was turned back to the median line, nystagmus and dizziness disappeared. This phenomenon appeared each time the experiment was carried out. When the head was turned to the right no nystagmus and no dizziness occurred. When the patient was lying on the stomach and the head was turned so that the left labyrinth pointed downward, nystagmus and dizziness also occurred but not to a great degree. When the head was kept in position, and the whole body was turned to the left side the feeling of dizziness was less and the nystagmus was limited to only a few small excursions yet an increase of the feeling of dizziness corresponding with the degree of turning from the dorsal position could be established. Turning of the whole body to the right with the head held stiff did not elicit any symptoms; nor did turning the body, bending the head to the right or left shoulder. Spontaneous birdlike quick turns of the head, to the right and left, did not cause any symptoms.

After treatment for six weeks, the patient was declared to be free from all symptoms. The anamnesis and the findings showed without doubt that the symptoms were elicited by a certain position of the head in space and not by quick turning motions or angle accelerations. The disease was located in the otolith apparatus and in the nerve tracks connected with the same.

It is interesting to note that the first attacks occurred after partaking of the same Tyrolian red wine which had repeatedly caused epistaxis and that the patient was vasolabile. Therefore, hemorrhage in the system of the position reflexes must be assumed. Anatomically, this condition must be added to those of a typical Ménière's disease. The location of the hemorrhage is problematic, also whether it affected only a single sense ending of the otolith system.

Perhaps the following observations may lead to some further conclusion. When the body was kept in a dorsal position and the head was turned from the median position to the left, the feeling of dizziness increased gradually and reached its height when it was turned as far as possible. The same applied to the nystagmus. The feeling of dizziness was similar when the whole body was turned to the left with the head held rigid. In this instance also, although not so pronounced as with the turning of the head alone, there was noticed an increase of the symptoms until a certain maximum was reached. This maximum corresponded to the position in which the left labyrinth was in the lowest and the right labyrinth was in the highest position. This phenomenon strangely calls to mind the observations of Magnus and de Kleyn. They found that the influence of the maculae on various organs (muscle apparatus of extension, muscles of the eye, etc.) moves between a maximum

and a minimum, and that a certain position of the otolith membranes corresponds to a certain degree of effect.

It is peculiar that, so far, authors have paid little attention to the localization of the focus of the disease. It was comparatively simple to do so in cases in which a middle ear disease was present or preceded (Voss and others). Although Brunner has stated that an otolith disease could be assumed only if another disease of the ear was present, there is no doubt that isolated diseases of the otolith apparatus exist. It is not entirely clear whether the nystagmus and the attacks of dizziness are an expression of overexcitability or of paralysis of the diseased side. In the latter instance, it would have to be assumed that the symptoms are caused by the side which is free of disease. The analogon would be a one sided labyrinth exclusion. Hellmann is inclined to place the disease in his case on the right side. There was a considerable lack of irritability of the right side when tested calorically, according to the method of Kobrak, which could not be caused by changes in the drum membrane alone. It must be attributed to the labyrinth and it agrees very well with the observations of Borries. Borries has found in cases of isolated diseases of the vestibularis a decrease of the caloric excitability with well preserved reaction on turning. The spontaneous past pointing of the right arm outward and the slight uncertainty in writing must be attributed to disturbances of the tonus distribution. Its origin must also be in the right labyrinth. This, however does not agree with the result in experiments in animals, which shows that one labyrinth is sufficient for the preservation of the tonus of the muscles. The increasing effect of the muscle system of the neck on the symptoms could be clearly established in this case.

Grahe has made observations of this nature. The almost inseparable connection of the otolith apparatus with the muscles of the neck presented itself in this case. Therefore perhaps it is advisable to combine, according to Borries' idea, all symptoms which come into consideration, under the heading "cephalostatic" symptoms and to speak of a disease of the cephalostatic system because correct points of view, especially a microscopic examination, are missing.

THE "RHINOLALIA CLAUSA FUNCTIONALIS" AND SOUND CONDUCT THROUGH MUSCLE. EMIL FROESCHEL, Ztschr. f. Hals-, Nasen-u. Ohrenh. **11**:142 (March 14) 1925.

Ingenious experiments with the aid of the thigh of a frog and the fist of a man, enabled Froeschel to demonstrate that for A, c, e, a, e^1 and g^1 the condition of contraction of a muscle does not influence the tone conducted through the same. Froeschel comes to the conclusion that the sound phenomenon, the so-called rhinolalia clausa functionalis, is not produced by a prevention of tone conduction from the mouth to the nose in consequence of a great contraction of the muscles of the velum.

AMBERG, Detroit.

Society Transactions

AMERICAN LARYNGOLOGICAL ASSOCIATION

Forty-Seventh Annual Congress, Held at Washington, D. C., May 4-6, 1925

L. W. Dean, M.D., *President, in the Chair*

SCIENTIFIC SESSION

Cysts of the Floor of the Mouth. Presented by Dr. Otto J. Stein, Chicago.

The variety and not infrequent occurrence of cysts in the floor of the mouth make this subject of sufficient importance for presentation to the laryngologist.

Confusion exists in the minds of some as to the origin, character, method of handling and similarity of these cysts to other forms of tumors.

A discussion of the various kinds of cysts found in this region, their origin, historical reference, citation of personal cases, differential diagnosis and methods of procedure followed.

DISCUSSION

Dr. G. Berry, Worcester, Mass.: Results were obtained by injecting methylin blue before starting the operation; this outlined the course of the duct all the way in the thyroglossal duct type of case. In the two cases recalled, one divided itself and went on each side of the hyoid bone; the other went behind the hyoid bone. Another case which he recalled was a little different; the duct went up the side of the neck. This was one of the branchial cyst type.

Dr. E. Ross Faulkner, New York: His experience had been fairly limited in this subject, but he wanted to say a word about the operative procedure in cases such as the thyroglossal and dermoid. He remembered, a number of years ago, operating on a thyroglossal cyst about the size of an orange. He did not make the incision quite big enough at the start, an accident prone to happen to men not doing surgery every day, and dissection was quite difficult. He was embarrassing the patient's breathing, and while he did dissect back to the base of the tongue he found it a difficult operation. He made up his mind then that the next time he operated on a patient with this condition — that he would use a laryngoscope as a guide within the mouth. It makes a difficult procedure simple. The laryngoscope is an excellent instrument to be used as a support. He had never before mentioned the use of the laryngoscope in this connection.

Dr. J. E. MacKenty, New York: With regard to the cutting of the hyoid body. On one or two occasions he had removed these thyroglossal cysts and removed the center portion of the hyoid bone with the cyst. It saved time and there seemed to be no objection to it. He saw no ill effects following the operation.

As to the method of holding the floor of the mouth forward, of which Dr. Faulkner spoke, he had used an ordinary breathing anesthetic flat tube (used by anesthetists). It holds the tongue in position and gives a hard background against which to operate.

Dr. J. F. Kernon, New York: Dr. Stein's method of a collar incision was interesting. Some years ago he had occasion to take care of one of these thyroglossal cysts or ducts — one that had been removed a couple of times before and had recurred. By removing the body of the hyoid bone in the manner Dr. MacKenty suggested, the operation was successful.

Dr. G. B. New, Rochester, Minn.: There were one or two points he would like to bring out that might be of interest. The dermoids are usually filled with putty-like material. The diagnosis of thyroglossal cysts was interesting. In addition to the points brought out in dissecting these cysts: after cutting the wedge out of the thyroid and following through from there, and instead of trying to dissect out the tract itself, a fingerlike area is removed.

The treatment of hygromatous cysts in children is difficult. The use of radium in these cases has cleared them up entirely.

Problems in Olfactometry. Presented by Dr. Arthur W. Proetz, St. Louis.

Two great obstacles which confront the investigator of the olfactory function are, strangely enough, the complexity of the central apparatus and the simplicity of the end-organ. The anatomy of the first cranial nerve and its central tracts and pathways has been minutely described.

Concerning their separate function, which in the aggregate produce those mental impressions which we interpret as smell, we are in total ignorance.

Although the central apparatus consists of a score of nuclei, tracts and fasiculi, which is hardly surprising when one takes into account the complexity of smell impressions, still the peripheral organ in the nose which records these impressions is bafflingly simple.

Three years ago, the writer began a study of the problem, not unconscious of the difficulties but encouraged by an observation made in 1908 by Read, that the terminal fibers in the nasal mucous membrane, supposed until then to form a plexus, are in reality not a plexus at all but a closely interwoven mass of individual and discrete neurons, proceeding separately to their terminations in the olfactory bulb. This appeared to open up at least a likelihood of the diversity of function extending into the end-organ.

The problems encountered are somewhat as follows:

First, the accurate measurement of olfactory acuity; second, a demonstration of the separability, from a physiologic standpoint, of the small complex into its components; third, a correlation of these components with anatomic structures in the brain.

DISCUSSION

Dr. Stein: This is an excellent contribution in this field of work because of the possibilities in differential diagnosis. He would like to ask Dr. Proetz how a patient not familiar with the odor could describe that particular odor.

Dr. Greenfield Sluder, St. Louis: The work that has been done in an effort to localize brain lesions was familiar. It seemed to him that the point made, the matter of fatigue, was not merely interesting but ought to be helpful in differentiation.

Pemphigus from the Laryngologist's Standpoint. Presented by Drs. Gordon B. New and Paul A. O'Leary, Rochester, Minn.

The diagnosis of pemphigus from the laryngologist's standpoint must depend on the history, the findings of the lesions of the mouth or throat that makes one suspect the disease, and, after repeated observations, the finding of bullae

on the mucous membrane. In all such cases a dermatologist should be consulted.

Lesions in the mouth and throat that simulate pemphigus are erythema multiforme and sprue. Other diseases such as syphilis, Vincent's angina and ulcerative and aphthous stomatitis, are usually included in the differential diagnosis. The progress of the disease, with involvement of the skin or other mucous membrane, is often confirmatory evidence.

Present methods of treatment of the various types of pemphigus are unsatisfactory.

Conclusions: 1. Contrary to the usual opinion, patients with pemphigus as a rule consult a laryngologist primarily, on account of trouble in the mouth and throat.

2. Many patients with pemphigus are given much treatment without a definite diagnosis.

3. The rapidity with which the cutaneous manifestations follow lesions of the mouth and throat is an index to the virulence of the disease and the length of life.

4. Early diagnosis of pemphigus is essential, in order that relatives may be given a prognosis, and to obtain for the patient early institutional treatment.

DISCUSSION

Dr. Cornelius Coakley, New York: These cases of pemphigus have been seen, but he never had the privilege of seeing one in the outpatient department, as Dr. New had, before the skin lesions appeared. They had always been cases of fairly definite skin lesions which had been referred for an examination as to the extent of the lesions in the mouth, the nose and in the lower parts of the pharynx. He had never seen one in the larynx. No treatment had given the patient any great amount of relief, and all these cases had gone on to a fatal termination sooner or later.

Dr. Harmon Smith, New York: Some years ago, he had seen two clinic cases, both in women beyond middle age. They came to the clinic without skin lesions and were under observation for quite a while before skin lesions occurred. Both of these patients died of intestinal complications. At no time did they have large manifestations of a skin lesion.

Dr. Henry L. Swain, New Haven: In the first pandemic of grip in the early nineties, an elderly lady came to him complaining of throat trouble. She had distinct blebs, almost exactly located as the first picture put on the screen. She lived for ten years afterward.

Dr. G. D. Wood, Philadelphia: Dr. New, in the treatment of these cases have you used intravenous injections of mercurochrome-220 soluble?

Dr. Lewis A. Coffin, New York: Two cases of this condition were seen by him. The interest centered in the first case, because the entire staff of the Manhattan Eye, Ear and Throat Hospital was baffled as to diagnosis until Dr. Jonathan Wright, at that time pathologist of the Hospital, was called in. Dr. Coffin said, "We are indebted to Dr. New for bringing this matter before us, in order that we may be better prepared for diagnosing this rare condition."

Dr. Harris P. Mosher, Boston: Occasionally, he has been in touch with what he supposed to be pemphigus of the mouth and larynx. One patient was a middle aged woman, who dated the beginning of her trouble to a trip west and the eating of corn. He wondered whether or not there was anything in the food basis for these cases. As Dr. New said most or many of his cases

were Russian Jews, he wondered if they could not be grouped as coming from a certain locality, the same as goiter cases are grouped in a certain locality.

He would like to ask Dr. New, in this connection, what he knows about transfusion.

Dr. H. H. Forbes, New York: With reference to the lesion that Dr. New found in the esophagus, was there any possibility of protein element affecting these cases? The only patient he had seen (the lesion was of the chronic type involving the mouth and skin) came to the hospital as an emergency case, with acute obstruction of the esophagus. A bismuth picture showed complete obstruction. Fortunately, a suggestion was made of the possibility of pemphigus being a protein poisoning and having a local effect. One injection of epinephrin cleared up the obstruction in the esophagus and the patient was able to swallow as well as normally. Dr. Forbes examined this patient within twenty-four hours with an esophagoscope; there was neither an erosion nor a pemphigus lesion that he could find.

Dr. New, responding, said that the food factor was an important one in etiology; that Dr. Swain's case seemed to be a herpes, also that he had used mercurochrome-220 soluble and transfusion, but without decided results.

Pachydermia Laryngis with the Report of an Unusual Case. Presented by Dr. Fielding O. Lewis, Philadelphia.

Two distinct varieties are found, presenting a totally different clinical picture, as well as different symptoms.

First: pachydermia laryngis verrucosa, so-called from its wart-like appearance; second: pachydermia laryngis diffusa, a more extensive and uniform hypertrophy of the mucosa.

The verrucosa type is usually found on the posterior extremity of the vocal cords in the region of the vocal processes; the laryngoscopic image reveals on one cord an oval thickening, grayish in color with a central depression; while on the opposite cord there is a wart like hypertrophy, the apex of which during phonation fits into the cupped depression of the opposite cord. Ulceration and inflammatory changes are absent.

The diffusa type was of equal or greater importance, as it was liable to stimulate or to be a part and parcel of the more serious disease, epithelioma of the larynx. It extended over a greater surface of the mucous membrane involving the whole cord, both cords or entire surface of the larynx. The symptoms, therefore, are dependent on the location and extent of the involvement.

A case is given in detail that necessitated total laryngectomy.

DISCUSSION

Dr. Swain: He recalled a case of pachydermia many years ago at the time when Virchow first described it. He obtained a section of it, which showed an enormous thickening of the epithelial layer. It never really became malignant. Of late years it seemed as though he had not seen any such condition.

Dr. New: He was fortunate in seeing the case to which Dr. Lewis referred. The pachydermia in this case was due to the fact that the man had worked at steaming tallow for about ten years. He thought the etiology in this particular case was especially interesting.

DR. COAKLEY: He had not seen a pachydermia of the larynx for some time, but it seemed to him from the pathology of this case that it would be interesting to know what would be done in conditions of this kind with that kind of epidermis. If he had such a case as that, he thought that he would perform a tracheotomy and use radium to see what the results would be, before proceeding to the extent that was done in this particular case.

MONDAY AFTERNOON SESSION

THE SIGNIFICANCE OF THE SCIENCE OF SPEECH CORRECTION. Presented by DR. MAX A. GOLDSTEIN, St. Louis.

Speech correction, handicapped and distorted by charlatans, commercialized stammering institutes and inadequately qualified teachers of voice, has at last reached the dignity of a science, due largely to the earnest and untiring efforts of such medical pioneers as Kussmaul and Gutzmann, Flatau and Avellis, Zwaardemaker and Mygind abroad; to Bluemel and Blanton, Martin and Greene, and our own colleagues Kenyon and the late George Hudson Makuen in America.

As knowledge was unfolded in anatomy and physiology of the speech mechanism, in neurology and the significance of cerebral localization in psychology and the relation of mental to physical stimuli, the fundamental principles were created for the establishment of a new science — the study classification and correction of defects in speech.

The correction of defects in speech affords even the most ambitious among us every facility for profound and dignified research, and a practical application of many experiences which we have gleaned in general laryngology.

This science is worthy of every support and upbuilding which laryngology can offer; its best interests have been served by few. Let the laryngologist in every community interest himself in the segregation, in the classification, in the pedagogy and in the uplift of the large group of cases of defects in speech to be found everywhere, so that laryngology may share in the glory and development of this splendid and useful young science.

DISCUSSION

DR. MACKENTY: He did not think anybody who had not seen these people before and after treatment could realize just what an uplift they get. He could quote dozens of cases in which patients have been down and out, without a means of support, young people of good and sometimes of high intelligence. When cured of the speech defect, they have taken responsible positions in which they have earned large salaries. Anarchistic tendencies and hatred of mankind have been obliterated by the healing of their speech defect.

With regard to persons having acquired speech after laryngectomy, he had three patients who have acquired stomach speech, and one other who is beginning to acquire speech and can talk quite audibly though haltingly.

OTOLARYNGOLOGY IN RELATION TO GENERAL AND MEDICOLEGAL MEDICINE. Presented by DR. BURT R. SHURLY, Detroit.

There is danger in the development of otolaryngology to an ultraspecialty that ignores the study of systemic disease. It must not be forgotten that many conditions in the upper respiratory tract are wholly systemic in origin and should be treated on a broad and liberal basis.

The close inter-relationship of pulmonary abscess and tonsillectomy, of laryngeal tuberculosis and the pulmonary variety, of hyperthyroidism and tonsillar ring infection, of mediastinal disease and laryngeal paralysis, of tonsillar infection and rheumatism, of psychoneuroses and focal infection, call for renewed interest in general medical diagnosis.

With the passing of the general practitioner, with the increased intelligence of the patient and with the diminution of referred cases, there must come to the specialist a greater interest in general medical diagnosis and therapeutics.

Five cases, associated with general and medicolegal medicine, were detailed.

DISCUSSION

Dr. T. H. Halsted, Syracuse, New York: He had one threatened suit of malpractice that continued over a period of ten or fifteen years. About twenty-five years ago, there was a child on whom he performed an intubation. The child was 2 years old and he put in a two-year tube. At all events, when the time came to remove the tube, five or six days later, he was unable to reach it and could not remove it. The next day he tried again and was unable to remove it. He then performed a tracheotomy and removed the intubation tube. He was never able to get rid of the tracheotomy tube, as has happened to many other physicians. The mother and child left the city and went to a neighboring city. A physician there did a laryngostomy, but was unable to remove the tracheotomy tube. The child was brought back to him in the course of a couple of years and he performed another operation but was unable to get rid of the tube, so the child continued to wear it. At the end of ten or fifteen years, he had a letter from a lawyer saying that this woman was instituting a suit, suggesting a settlement which he refused and the affair ended. The case never came to trial.

Another case which Dr. Shurly's last case suggested was this: His assistant, in his absence, gave the anesthetic, injecting the patient while Dr. Halsted was washing up. The assistant came in and whispered that he had injected a 10 per cent. solution of cocain into only one tonsil. The tonsil was taken out immediately. The patient survived, but only after heroic measures were instituted.

A Case Report of Laryngeal Carcinoma. Nonreturn at the End of Three and a Half Years. Radium Treatment. Interesting After Result, and Plexiform Neuroma of the Pharynx. Presented by Dr. Forbes.

Case 1.—This was an interesting case of destruction in part of the posterior-laryngeal wall with nonrecurrent carcinoma of the larynx treated by radium.

A woman, aged 45, American, was seen Aug. 20, 1921. There was a laryngeal new growth on the left half of the inside of the larynx, with loss of voice and dyspnea. The patient told the history of removal of a growth several years ago; she was then informed that it was a papilloma. Under direct laryngoscopy, the picture was most confusing. The mass involved the left aryepiglottic fold and the left false cord as well as the interarytenoid space. Dr. Forbes' diagnosis at the time was papilloma, which was confirmed by the laboratory findings. September 20, the growth had extended down the posterior wall of the larynx. The laboratory report (three specimens) was chronic inflammation. About this time a tracheotomy was necessary owing

to dyspnea. On November 28, a specimen was removed which resulted in the following report from our laboratory:

Nature of Specimen.—Tissue from larynx.

Result of Examination.—Gross: The specimen measured 5 by 5 by 3 mm. It presented a somewhat wrinkled mucous surface. It was only moderately firm. On section, it was brown.

Microscopic.—Serial sections were prepared of the entire specimen. Many of these sections revealed no further information. In some of them, however, there occurred areas in which solid groups of epithelial cells were found deeply situated in the fibrous stroma. These cell groups were without lumen and showed no recognizable tendency to cornification. Mitotic figures were scarce. At one spot there was a small ulcer over such an area. The adjacent stroma was rich in inflammatory cells. By examination of the series of sections one was assured that these cell groups were not merely infoldings of the epithelium but represented an actual abnormal location.

Diagnosis.—Basal cell carcinoma.

The case presented certain interesting features. First, the history of a nonmalignant growth of several years. Second, the noncharacteristic picture of the laryngeal growth. Third, the number of specimens removed before one was found showing malignancy. Fourth, the elapsed time (three and a half years), with nonrecurrence of the growth. Fifth, equally important to the patient, was the loss of tissue involving the posterior wall of the larynx and cicatricial contraction involving the true and false cords. Attempts to dilate this contraction in order to remove the tracheotomy tube resulted in a part of her food, especially liquids, finding their way into the trachea. During the time of treatment, Dr. T. J. Harris was in consultation and has seen this patient recently. Other members of the Society have also examined her, namely, Dr. Emil Meyer, April, 1923; Dr. Byron Delavan, June, 1923; Dr. Chevalier Jackson, June, 1923.

CASE 2.—This was a plexiform neuroma of the pharynx, in a girl, aged 14 years.

The patient was admitted to the Post-Graduate Hospital, New York, in October, 1924, with a history of increasing dysphagia and nasal obstruction. Examination of the neck showed a few cervical glands slightly enlarged. The nose was normal. Examination by the mouth showed a large, irregularly smooth mass occupying practically half of the faucial pharynx and involving the portion of the right tonsillar pillar. The left half of the pharynx was not involved. A specimen taken at this time was reported to be a nerve tumor of embryonic origin. The tonsil was removed on the right side and the posterior part was found to be involved. Later, an attempt was made to remove the growth. Under a general anesthetic the greater part of the tumor was removed. The recovery was excellent.

The Pathologic Report, Oct. 29, 1924, was as follows:

Nature of Specimen.—Pharyngeal tumor.

Result of Examination.—Gross: There were nine pieces of tissue. The largest measured 30 by 23 by 8 mm., and the smallest 10 by 5 by 4 mm. All were irregular, pale pink, semisoft and resilient tissue for the most part, and loose in structure with coarse papillary projections on the free surface. On section, there were white and translucent streaks throughout, suggesting fine twisted nerve trunks.

Microscopic: Sections from all pieces showed the same structure. There was a partial covering of stratified squamous epithelium. Beneath this, there

was a stroma of loose connective tissue for the most part and in part dense fibrous tissue. Embedded in this were mucous glands and abundant striated muscle fibers. The most abundant tissue, however, was in cross sections of the nerves. These appeared throughout in various shapes as round, oval or elongated and tortuous. They showed highly cellular fibers in parallel arrangement with central denser compressed portions and peripheral sheath. These reacted to specific stains as nerves react and indicated a remarkable hyperplasia of nerves.

Diagnosis.—Plexiform neuroma (very rare in this location).

Note.—These recur locally.

Radium applications were given internally and externally. On March 11, 1925, examination showed that the pharynx was negative.

DISCUSSION

Dr. Ward J. MacNeal, New York: The first tumor was not the highly malignant condition ordinarily thought of when we use the word cancer. If it had been in an accessible part of the body, one would feel that a single dose of radiation would eliminate it. The interest here, of course, was in the location, the larynx, where it was not by any means accessible. Nor was it with the same amount of assurance that one applied radium or roentgen ray to a locality of this sort. This tumor, however, was extremely slow in growth, and in spite of the fact that the patient seemed to be doing well, more time would be required before the possibility of recurrence could be eliminated.

The second pathologic specimen was of peculiar interest because it showed the embryonic type of neuroma, in which there are elements of nerve fibers and also ganglion cells in an embryonic stage, suggesting the possibility of this tissue developing in either direction. The observation of a tumor of this sort indicated that the neurofibroma and the ganglionic neuroma are nearly related or even in the same tumor group.

Dr. D. Crosby Greene, Boston: His experience had not been favorable as regards the use of radium in the treatment of laryngeal carcinoma at the Huntington Hospital in Boston. Only three out of the total number have responded well to the use of radium directly applied to the tumor. His position in regard to radium treatment was, that it was not the best treatment for carcinoma of the larynx in operable cases. He used it in cases that appeared inoperable, a great many cases were arrested by the use of radium and the high voltage roentgen-ray treatment, and lives were prolonged for a long time by this means. He did not advise radium in the treatment of cancer of the larynx as a routine procedure. When it comes to the question of what cases are operable or inoperable, there is room for variation in judgment as to what procedure should be adopted.

Dr. Wood: He recalled a case of a man with inoperable carcinoma of the larynx. Although a biopsy was not done, the diagnosis was confirmed by Dr. Fielding Lewis. As he had some inspiratory dyspnea, a tracheotomy was done from which he recovered, after a temporary reaction for a few days. After two or three weeks had elapsed, roentgen-ray treatment was started, although no great hope was held out for any permanent cure. On the night after the second exposure the patient had a sharp chill, followed by a rise in temperature and marked swelling of the glands of the neck and the periglandular structures. This swelling progressed until the neck was bulging out beyond the chin line and the ridge formed by the clavicle. Deep

incisions in both sides of the neck did not show any abscesses, revealing only edematous tissue. The condition rapidly progressed, with a septic temperature, and the patient died on the sixth day. Dr. Wood felt that there was probably a peri-esophageal infection from ulceration of the carcinoma, and that the roentgen-ray treatment produced a fulminating activity of this infection.

DR. NEW: He could only add a word and really repeat what Dr. Greene had said, because his attitude in the treatment of malignant conditions was identical. He had had only one case of epithelioma of the larynx treated with radium. This was a man, aged 72, who was not a suitable subject for surgery; this was four years and three months ago. The man has had no recurrence. But that did not change his attitude of how these cases ought to be treated. Every case of carcinoma of the larynx should be surgical if it was operable at all. He thought thyrotomy excision should be limited to low grade types of malignancy in patients who could have the cord removed with the growth. If one attempted to operate on tumors larger than that, laryngectomy was far the safer procedure.

DR. W. V. MULLIN, Colorado Springs: Dr. Forbes referred to his paper before this Society last year and the discussion brought out at that time. Regarding biopsy, he believed if one does it in all cases that he will lose out. The harm from biopsy, unless one operates immediately, will offset the good that is derived from it in the occasional case. The teachings of Dr. Bloodgood are that to do the biopsy the surgeon should operate immediately, for otherwise it will probably lead up to a rapid spread of infection.

DR. LEWIS: He was glad to hear Dr. Greene say what he did about the treatment of laryngeal carcinoma. His feeling was that as soon as we can educate the physician and the specialist that the only form of treatment for laryngeal carcinoma was surgery when it was operable, the more patients we are going to save. He personally, had seen more patients than could be imagined treated by radium on whom operation was possible, but who were neglected until operation was out of the question, when operation would do no good. He felt a biopsy should be made in all cases. He had seen conditions which both Dr. Jackson and himself thought malignant, but which biopsy proved otherwise. Also he had seen just the reverse. Therefore, his method was to make a biopsy and operate immediately.

DR. MACKENTY: The longer he treated cancer the more radical he became. He believed that if the cancer was on the surface of the cord, not deeply situated and occupying a small section of the cord, a thyrotomy should be done, though one could not promise the patient a cure. In some of the incipient cases he had investigated, he found surface extensions backward and forward to a point beyond the growth.

Of course there are cures for cancer by radium that are of interest, but they have the effect of making people think that radium should be used in all cases.

DR. C. J. IMPERATORI, New York: He would like to ask Dr. MacNeal whether or not he has been able to correlate the degree of malignancy with the clinical and pathologic findings.

DR. V. P. BLAIR, St. Louis: What was the opinion of this Association in regard to the treatment of cancer of the larynx by radiation from the outside?

PRESIDENT DEAN: He was glad the question of performing a biopsy had entered into this discussion. In his judgment, this was far more important

than the question of the use of radium in the larynx. In the University Hospital, as soon as a patient suffering from a tumor of the nose, jaw, pharynx or larynx entered the service, and as soon as it was felt that the patient was going to be guided by advice as to operation or to treatment, if there was a possibility of the tumor being malignant usually a biopsy was performed, cauterizing the wound at the time of the removal of the piece. He had been impressed by the work of Broder and felt that before he could properly advise the patient as to the particular type of therapy needed in his case, it was necessary to have not only a knowledge as to the kind of growth that we were dealing with but of the malignancy of the growth. Dr. Dean said he had not seen a bad result from biopsy and thought the dangers of biopsy are exaggerated. He would not be inclined to agree with Dr. Blair regarding biopsy for tumors of the larynx. Unless certain as to the type of tumor that is in the larynx, a biopsy is performed. If the pathologist returned a diagnosis of a malignant growth, the information was of value. On the other hand, if the pathologist returned the opinion that the growth was not malignant and clinically it was malignant, he disregarded the pathologic report. In other words a positive report was of great value and a negative report should not be depended on.

Dr. Swain: He had a patient with what seemed an operable epithelioma of the larynx. The diagnosis was made without biopsy. A complete and satisfactory hemilaryngectomy was done, and to make assurance doubly sure he felt, as did Dr. Wood, that the use of radium would hinder any chance recurrence. This was done, but the cartilage reacted badly, and the patient died from practically no other reason than this over action of the radium. The diagnosis was correct, as proved by the microscope.

When one sees how much radium can accomplish, one cannot help but hope that some time radium can be used so that its application will help in the complete healing of the patient.

Dr. *Smith*: Within the last five days, a traveling salesman came to him with a history of hoarseness extending over a period of seven years. This man had a clinical picture of a papilloma of the larynx. A piece was taken off, with the expectation of giving a favorable report. Clinically, the condition was a papilloma, but under the microscope the specimen was malignant.

Dr. Smith did not believe that anyone could determine the type of growth, its malignancy or its character by looking at it or from clinical symptoms alone. That was one thing that led him to believe that biopsy was essential. He had never seen any bad results immediately following a biopsy. He believed a biopsy should be made either during or before operation; it should always be made before a major operation.

President Dean: With your permission, Dr. Forbes, I will ask Dr. MacNeal to answer Dr. Imperatori's question.

Dr. MacNeal: From his own cases he had no analysis to present. It is well known that carcinoma of the larynx is of a slow growing type which metastasizes late in the disease if at all. The danger to life is local rather than general. This particular tumor which Dr. Forbes presented is even less malignant than the usual laryngeal epithelioma, because there was not even conification found in the little masses of cells down beneath the basement membrane. It corresponded more to the type of basal cell carcinoma. In older men such tumors may exist for years.

This question of biopsy is of interest. Those men who do not practice biopsy would do well to submit their surgical specimens to a pathologic analysis in order to check the preoperative diagnosis.

On the question of radium, he was by no means convinced that radium was the purely beneficent agent which the public imagined. It occasionally gave rise to serious consequences. However, the mistrust of radiation expressed by the physicians here resembles somewhat the mistrust of the laity in their fear of the knife. The laity realizes that a knife may be used in unskilful ways and may cause damage. Radium is equally dangerous in unskilled hands.

REPORT OF A CASE OF RHINOSCLEROMA. Presented by DR. WOOD.

A man, American, developed rhinoscleroma. The condition has existed for about five years, involving first the left side of the nose and a year or two later the right side. The throat symptoms have only been in existence for five or six months, and the external part of the nose has also been involved for about this length of time. The patient at first improved under the use of antimony and potassium tartrate injected intravenously, but for the last month or so the condition has remained the same.

DISCUSSION

DR. SMITH: About the year 1910 or 1912, there were five cases of rhinoscleroma in his and in Dr. Jonathan Wright's clinics. These were verified by microscopic examination. In experimentation, he had employed the roentgen ray at first. Radium was not available and not much was known about it. It apparently had no influence. One young man particularly (all these patients came from Russia, Austria and Poland) who was treated had laryngoscleroma as well. This patient was the most advanced case.

Dr. Guntzer made a vaccine from the three bacilli — Friedlander, Frisch and Abel — and the results of his conclusions were depressing. The patient with the most advanced condition disappeared. In the course of five years he returned but there was no progress in the course of the disease. The condition had remained the same, but the man concluded that the vaccine must have had some inhibitory influence. The other patients disappeared.

At that time there was no case on record that could be verified in which the condition had occurred in American-born persons. The Baltic Sea basin was where most of the patients came from. Some of these patients gave a history of a recollection of some condition existing similarly in blood relations in the past. The fact that the patient cited was Austrian born might lead one to believe that the condition could be inherited.

TUESDAY MORNING SESSION

SINUSITIS AND SWIMMING; FURTHER OBSERVATIONS OF ETIOLOGIC FACTORS, WITH SPECIAL EMPHASIS ON MAN'S LACK OF ADAPTION TO AQUATIC HABITS. Presented by DR. H. MARSHALL TAYLOR, Jacksonville, Fla.

Why is man so susceptible to sinus diseases, while lower animals breathing air as man does and living constantly in the water, do not encounter these difficulties? What have air-breathing aquatic animals to protect them from sinus infection which man is so likely to contract when he places himself in their normal environment and practices their activities?

It seems that aquatic animals are adapted mechanically to their habitat, which adaptations, even without natural physiologic immunity, would adequately protect them.

When man is out of his normal sphere he must understand what limitations nature has placed on him, and not ignore the basal laws that regulate his own being.

Sinus infections secondary to swimming evidently come from one or both of the following sources: foreign bacteria may gain entrance to the deeper portions of the nasal apparatus and adjacent structures; or bacteria normally and constantly present in this region may be allowed, by a lowered resistance on the part of the person, to multiply to pathologic proportions.

DISCUSSION

Dr. R. A. Fenton, Portland, Ore.: Dr. Taylor's active work along this line for a good many years deserves recognition, and deserves great commendation because he reminds us of the biologic shortcomings of human beings along this line. It is something we need reminding about with the number of swimming tanks in constant use throughout the nation. We should place the sense of these limitations before the public. We should get away from the notion that bacilli in swimming tanks is mainly the cause of infection. With that in mind, and the understanding of the various public health officers throughout the country, we should turn our attention to methods of prophylaxis against further injury to these structures which are not protected in any measure as they are in aquatic animals.

Another most important contribution which Dr. Taylor has made is the intensive study of the matter of chill. That has been studied by bacteriologists, but has been ignored by a great many of us. That should point out, of course, another factor in prophylaxis — getting out of the swimming tank within a reasonable length of time.

Dr. Smith: Unquestionably, sinus trouble is on the increase, particularly since women as well as men are beginning to compete in swimming contests. Another factor is the method of swimmnig. Dr. Jonathan Wright, before Dr. Mudd took up the subject, undertook to demonstrate the surface tension and the biochemical conditions of the surface mucous membrane. We have reason to believe the sinuses remain without bacteria until they gain entrance thereto. We carry innumerable bacteria in the nose and larynx. If the surface tension, biochemical change or biochemical equilibrium is lessened, the bacteria in the nose will gain entrance. Whether that is due to the lessening of the function of the epithelium by the presence of water, which irritates the nose, or is lowered by chilling, is immaterial. He believes infection in the pools plays a less part than the lowered tension, which allows the infection in the nose to gain entrance into the sinuses.

Dr. S. R. Skillern, Jr., Philadelphia: Hitherto, there has been a great deal of confusion as to the exact etiologic factor from sinusitis in swimming. He was under the impression that the cilia played an important rôle. To his mind, the cilia or action of the cilia, was the crux of the situation. The bacterial content of the pool, of course, plays an important part, as was shown by Dr. Fenton several years ago. The chilling of the body, as Dr. Taylor has shown, certainly lowers the resistance. Anything that lowered the resistance was going to lower and retard the action of the cilia.

Dr. J. M. Ingersoll, Cleveland, Ohio: Nearly all of the birds are provided with some method of closing off the nose posteriorly. The posterior nares have

finger-like projections which interlace and shut off the nose from the pharynx and the larynx. If the nose is open anteriorly, it is closed posteriorly so that the water cannot circulate through. In man, the sinuses are rudimentary and the maxillary openings are high up so that fluid getting into the maxillary sinuses tends to remain there and is one of the factors causing the infections. Nearly all of the lower animals (the dog, for instance) can close the external nares when they go under water so that little or no water enters the nose. As the sinuses are filled with air, the air acts as a cushion and probably not very much water enters the sinuses, except under pressure as in deep diving and in jumping into the water feet first. In a certain percentage of maxillary sinuses there are accessory openings. Such sinuses are more liable to become infected.

Dr. Mosher: It is well known that women are better swimmers than men. They stay in the water longer than men. He would like to ask Dr. Taylor whether he observed in children that the girls presented less loss of heat than the boys. It seemed to be the general opinion that it is the infection of the water rather than the water itself which causes the trouble.

Dr. Wood: Catching cold depends on a predisposing cause, such as chilling the body, and also on an active cause, namely, the presence of infecting bacteria. His experience in camping out in the wilds, where there were no pathogenic germs and where there were various forms of body exposure, never resulted in the production of respiratory infections. The history of troops camping out of doors is confirmative of his personal experience. In other words, the body may be exposed to almost any degree of chilling without a cold being contracted, if one can keep free from bacterial contamination.

Dr. D. B. Delavan, New York: Would Dr. Taylor summarize the remarks which related to the practical side of the question, and make a popular document of it?

Dr. Swain: Two factors are convincing. We do have contamination of the pool and do not know it. We have better managed pools and certainly much fewer bad results from swimming than we had in the old days. However, it is an interesting fact to know that the boys who indulge in water polo and who have much more traumatism of noses, have a higher percentage of colds and sinusitis than those who go in to swim and come out again.

He agreed heartily with Dr. Delavan's suggestion that whatever information possible should be published, to help the public. Further, that they ought to be cautioned that when they have acute rhinitis they should not go in swimming, as they are much more liable to get sinusitis.

Dr. Coakley: The furunculosis seen in those subjects who indulge in surf bathing is the most difficult to handle. At Montauk Point, there was no question of contaminated water. The water was clear, free from sewerage, and yet we had a great deal of sinus and ear infections in the ocean bathing. A number of the children who could not stand the buffeting of the surf went into the bay, which was only a couple of miles away; there was less infection in those who bathed in the bay water than in those who went into the ocean. In the first place, the water was cold; there was almost always a breeze blowing. The bathers became chilled, went into the water again, and stayed in a long time. Dr. Coakley found sand in the external canals and softening of the walls of the epithelium of the external ear. The abrasion by the sand made it easy for the development of severe attacks of furunculosis.

Dr. Taylor: In his own state (Florida) in all the pools, the children were not allowed to stay in for more than forty-five minutes. This rule was instituted

last year. In his city, where there was a great deal of swimming and bathing in the summer time, it was astounding the number of children who had the sinuses infected, and various other complications.

Relative to the publicity given to this matter, the question of prevention of this condition has been fully covered, and a review of the literature will show that everything has been done by the American Public Health Association.

PRESENTATION OF SPECIMENS

OSTEOMYELITIS OF THE SKULL. Presented by DR. J. H. BRYAN, Washington, D. C.

The specimen, taken from a young girl on whom an operation had been performed for osteomyelitis of the skull, followed a sinus operation performed in Nashua, New Hampshire. Last summer this girl, aged about 16, in perfect health, left Washington to attend one of the girl's camps in New Hampshire. She indulged in bathing in the lake and was seized with intense headache. In the course of twenty-four hours there was a marked swelling over the right frontal bone and partial closing of the eye by the swelling of the corresponding lid. The operator did not see this patient after the operation. She made a slow recovery under the attendance she was receiving there; finally, when she reached Washington there was a swelling over the frontal bone and this portion of the nose, through which large quantities of pus were discharging. The swelling of the lid was very marked. She could not raise it sufficiently to get any vision.

The patient was operated on, and this specimen of osteomyelitis, which extended beyond and well up toward the eminence, was removed. A large quantity of bone was taken away; the whole orbital roof was removed entirely. She made a good recovery, excepting for a slight infection of the frontal sinus six months later, which was relieved by a second operation.

CICATRICIAL STENOSIS OF THE TRACHEA WITH A REPORT OF THREE CASES. Presented by DR. IMPERATORI.

In this report three cases are detailed. The etiologic factors were as follows: in one case the cause was a poorly performed tracheotomy following a laryngeal operation; in the second case, the resultant scar following a razor slash was the cause, while in the third case, diphtheritic erosion and repeated intubation was the cause of the cicatricial web.

The webs of scar tissue were all located on the anterior tracheal wall at 1½ inches, 1 inch and ½ inch, respectively, below the glottis. The shape of these webs was irregularly crescentic, with the concavity directed posteriorly. The most prominent symptom was increasing dyspnea, with some hoarseness. The first patient's hoarseness was of long duration and was due to ankylosis of the crico-arytenoid joint on one side. The other two patients had chronic laryngitis.

Cyanosis was marked up to the time of operation in all three patients, but operation gave prompt relief. All were operated on by the direct method, using a tracheoscope and punch forceps. The treatment was continued by graded dilatation.

In the razor slash case, four years have elapsed since the last dilatation; in the second case, two years have passed; while in the third case, but six months have elapsed.

All have good speaking voices excepting the first case, who has an ankylosis of the left crico-arytenoid joint.

DISCUSSION

DR. BERRY: His experience with tracheal web had been in army work. His patients had more fibrous deposits than those which Dr. Imperatori had so clearly outlined. His research also led him somewhat into the reports of the work done in Bordeaux. There, investigators came to the extreme position that the results were best when the trachea was opened widely, a trough established and maintained, with plastic closure later.

EMPYEMA OF THE FRONTAL SINUS WITH ABSENCE OF SYMPTOMS OTHER THAN HEADACHE AND LOCAL TENDERNESS. Presented by DR. HORACE NEWHART, Minneapolis.

The purpose of presenting this paper is to call attention to the possible occurrence of cases of empyema of the frontal sinus, in which only severe frontal headache with local tenderness on pressure are present, all other usual objective diagnostic evidence being wanting.

The standard textbooks largely fail to point out the possibility of encountering such cases in practice. Two recent cases in Newhart's experience stimulated a somewhat exhaustive examination of the literature since 1910. This revealed the very small number of cases reported, and also suggested the possibility of the more frequent occurrence of such cases than is generally supposed.

Anatomic variations make the absence of endonasal symptoms possible. The roentgen ray and transillumination may both fail to yield positive signs. No leukocytosis or elevation of temperature were present. Two cases were reported.

Conclusions.—Cases of this type demand an early exploratory operation of the frontal sinus when severe frontal headache, not satisfactorily explained by other conditions, is present, even though the other usual signs of frontal sinusitis cannot be demonstrated.

DISCUSSION

DR. LEE M. HURD, New York: It seemed that most of these cases were due first to the occlusion and expansion of ethmoidal cells. He had seen several cases in which he thought there was no frontal sinus. He issued a warning about neglecting the teeth.

DR. SWAIN: When he saw this patient, the opening from the frontal sinus in the nose, though ample and well executed at the time of the operation, had closed. The attacks of sinusitis recurred. He tried for two winters to live in New Haven, but could not remain the whole year through. The coming winter he anticipated spending in New Mexico in order to pass one winter without a recurrence. Later, he hoped to come back to Yale for his degree, which persistency should be rewarded.

DR. MACKENTY: A patient, who came under his observation five years ago was in the class to which Dr. Newhart referred. For many years, this woman had been suffering from intense pain over the frontal sinuses with periods of remission. She had tenderness over both the frontal areas, but in the nose there was no evidence whatever of any sinus disease. The ethmoid and other sinuses were normal in appearance, roentgenographically and otherwise. The condition became so intense that it was decided to open the frontal sinuses. The roentgenogram did not help very much in defining the pathologic changes. Looking at it from the side, the frontal sinuses went up to the hair line and were not deeper than 0.5 cm. in the deepest portion. There was no pus in either sinus. They were both filled with granulating tissue and the pathologic evidence showed that an obliterating condition was taking place in the sinuses. An interesting

condition was seen on the floor of the sinuses in which the frontal nasal duct opens. There was no evidence of the frontal nasal duct. It had disappeared and its place had been taken by an area of solid bone. The frontal sinuses had been shut off entirely from the nasal spaces. The anterior walls were removed and the sinuses obliterated, causing a slight deformity but with entire cure of the headache.

DR. MOSHER: In acute sinusitis it is not essential to have pus in the nose. It is well known that the secondary frontal sinuses (which are really ambitious ethmoidal cells which poke their way up into the frontal sinuses) are embarrassing to handle. The ordinary pain of acute frontal sinusitis is severe.

TUESDAY AFTERNOON SESSION

THE IMPORTANCE TO THE PEDIATRICIAN OF INFECTIONS OF THE PARANASAL SINUSES IN INFANTS AND IN YOUNG CHILDREN. Presented by DR. PHILIP C. JEANS, Iowa City.

A large part of the work of the pediatrician concerns infections, even in the field of infant nutrition. A large proportion of these infections consists of or results from upper respiratory inflammations. For many years the importance of diseased tonsils and adenoids has been realized, both in their direct and indirect effects. That paranasal sinus infection is of equal importance is not quite realized. In many instances, improvement following the treatment of sinusitis has been so definite and marked as to be convincing as to the rôle this infection had played.

Part of these descriptions concerning the remote effects of sinusitis might be summarized by stating that any condition which may result from a focus of infection may also result from sinus disease. Among such conditions are included the following: cardiopathies, rheumatic fever, chorea, nephritis, pyelitis, certain cases of cyclic vomiting, deforming periarthritis, anemia, anorexia, malnutrition and chronic digestive disturbance. To these also may be added certain cases of neuritis and possibly erythredema (acrodynia).

Certain remote effects seem more or less peculiar to sinus disease. It is not sufficiently appreciated that confined infection in infancy may cause such an acute disturbance, with symptoms almost wholly referable to the gastro-intestinal tract that frequently lead to death if the infection is not found and treated adequately.

Dean has reported several instances in which death in infancy seemed to be due to sinus infection exclusively.

That a relationship exists between tonsillitis and abdominal pain is well known. Doubtless the same relationship exists between sinusitis and abdominal pain.

In 1923, Marriott and Claussen pointed out the relationship between sinus infection and parenchymatous nephritis (nephrosis). All of the nephritic patients studied had sinusitis, and the causative organism was found to be a staphylococcus. The interrelationship was shown by the prompt decrease of the albuminuria and edema on free drainage of the sinuses.

DISCUSSION

DR. MCKIM MARRIOTT, Washington University, St. Louis: About six years ago, at the meeting of the Journal Club of the St. Louis Children's Hospital, Dr. Jeans reviewed an article by Dr. Dean on the subject of "Sinus Infections in Childhood and their Effects."

That was the start of a new era for us. Until that time, we, like other pediatricians, had an idea that children did not develop sinus infections very often, that when they did there were definite symptoms, perhaps headache or something of that kind, and that the diagnosis could be made without difficulty.

Dr. Jeans mentioned the matter of nephritis, acute chronic interstitial nephritis. There are two forms of this disease; they can be clearly differentiated and the treatment and the causes of the two are different. The one form, which is associated more frequently with staphylococcus infections of the nasal sinuses, particularly the maxillary sinus, is accompanied by marked edema, diminished urine with large amounts of albumin, but without any change in the blood pressure. This condition may be differentiated from the other forms by examination of a few drops of the blood. Claussen showed that if the serum of these patients was drawn and allowed to drop, the weight of the drop was distinctly less, even less than under normal conditions and in other forms of nephritis, that difference being due to a change in surface tension. Claussen demonstrated a substance which changed the surface tension in the blood of these patients. When these staphylococcus infections of the nasal sinuses were cleared up by drainage or by irrigation, this peculiar substance present in the blood and urine completely disappeared, and at the time it disappeared all of the symptoms of nephritis disappeared, these patients changing from swollen edematous children to normal persons, to remain normal unless a second attack of sinusitis occurred.

The second form of nephritis is the glomerular, or hemorrhagic, nephritis. This is the result of streptococcus infection which may be in the sinuses, but is more likely to be in the tonsils and adenoids, or the middle ear and mastoid. In this form of nephritis there is blood in the urine, high blood pressure and retention of nonprotein nitrogen. Edema is rarely marked. The blood serum shows a normal surface tension. There is a change in the capillaries throughout the body, and the condition may often be diagnosed even without examination of the urine if the skin capillaries at the base of the nails are observed under the microscope. These capillaries show characteristic changes. Whenever we see these changes, a search is made for streptococcus infection, which is likely to be found somewhere in the mouth, nose or throat.

In children, there are many other conditions besides nephritis which may be attributed to sinus infection. Indeed, so frequently are the sinuses an important factor in producing disease during childhood that it has become our custom almost as a routine to ask the rhinologist to examine the sinuses of children presenting themselves for medical treatment. A frequent type of case is the child who is pale and undernourished, who has a slight elevation of temperature in the evening and occasionally a cough. These children often come to the hospital with a diagnosis of tuberculosis and occasionally of malaria. Sinus infections are usually found, and when treated the symptoms rapidly disappear.

DR. COFFIN: The study of sinus disease in children had been forced on him because many years ago his daughter, aged 10, had a condition accompanied by marked chills and fever with no improvement under the antimalarial treatment of a good pediatrician. On examining her nose, Dr. Coffin found a stream of pus coming from the middle meatus. Immediate improvement and complete recovery followed treatment of the sinuses. About that time, claiming to have opened the sphenoid through external incision in a boy, aged 9 years, he was told he could not have done so because children of that age had no sphenoids; which started him at work on the anatomy of the sinuses in children. Dr. Coffin, emphasizing the importance of Dr. Jeans' paper, cited a

case of a girl, aged 10 years, who was suffering intermittently from high fever, nausea, delirium and convulsions. She had been almost three years under the care of an excellent pediatrician and treated for almost everything that might account for the symptoms except sinus disease. A rhinologist was called in, who treated the sinuses; the child made a speedy and complete recovery.

Dr. E. McGinnis, Chicago: About six years ago he had a patient, a man, about 36, with severe asthma, referred to him. Everything possible medically had been done for this man without much result, and he was finally sent up to the Nose and Throat Department. Dr. McGinnis found a thin secretion coming out of the middle meatus on each side, and a diagnosis of chronic ethmoiditis with acute exacerbation as the cause of the asthma was made. He opened the ethmoids and made cultures from the inside of the cells. After the return of the culture, the bacteriologist made an experiment, and asked Dr. McGinnis to come over and see the necropsy on the animals, which disclosed the condition to which Dr. Marriott referred.

Dr. Ruhräh, Baltimore: More patients with kidney trouble had the condition cleared up under drainage of the sinuses, removal of tonsils, or opening of the mastoid than any other treatment. He had seen quite a number of cases of recurring abdominal pain which was one of the most puzzling of all conditions.

Dr. MacKenty: How extensive was the sinus disease and how much was done? Was the operative work carried into the maxillary sinuses or into all the sinuses, and what operative procedure was followed out in some of the cases mentioned?

Dr. Mosher: When Dr. Dean began with this work he could not bring himself to believe that the ordinary dirty nose of an undernourished child could be responsible for all the ills laid to it. The maxillary sinus is the one from which actual visual as well as demonstrable pus comes.

Dr. Swain: Dr. Marriott, is this substance, which is found in the blood of those infected with staphylococci, and which makes it drip differently from normal blood, capable of easy detection?

Dr. Marriott: The means of detecting this substance in the blood and the apparatus necessary was a dropper and a chemical balance. It is quite easily done. It is protein compound, soluble in water, and has various other properties.

The Retracted Nose. Presented by Dr. V. P. Blair, St. Louis.

Retraction of that part of the maxilla which forms the foundation of the cartillaginous nose and related part of the upper lip, may cause changes in the human face that may vary it from not pleasing actually to hideous deformity. The abnormality is more evident when viewed in profile.

The cases observed by the writer have fallen into the following etiologic groups:

A, those of apparently natural occurrence; *B*, those due to an actual loss of bony foundation of the lip, nose or both, from trauma or disease; *C*, those in which the retraction has followed repair of a single or double congenital cleft of the lip and palate.

To correct these, the maxillae may be built up with cartilage; the cheeks, alae and columella may be transplanted forward. The condition may require lengthening of the nasal tube. The insertion of cartilage into the bridge may

help somewhat in connection with other operations, but is rarely satisfactory by itself. Some conditions have been so marked that it was necessary to add both to the lining and covering of the nose. In nose retractions that follow operations for double congenital cleft of the lip and palate and in certain other types, it may be necessary to lengthen the columella at the expense of the lip.

DISCUSSION

DR. NEW: He followed the method of Gillies, first attaching a splint to the anterior teeth, making an incision between the cuspids. With the use of compound attached to copper wire and this attached to the splint, the entire inside of the nose was grafted with full thickness skin graft from the leg.

DR. DELAVAN: This carried him back to the days when he was Resident House Officer in the Presbyterian Hospital, New York, and used to assist Dr. Gurdon Buck at operations. Dr. Buck contributed many admirable original ideas to surgery, especially in plastic surgery of the face.

Dr. Thomas Sabine, New York, many years ago attempted to restore the nose of a well-built young man, whose external organ had been completely destroyed. He attempted to remedy it by affixing to the face the middle finger of the patient. Surgically, the effort was successful. When the man passed along the street, however, people could not help gazing at the weird spectacle of a perfectly evident finger fixed in the most conspicuous part of a human countenance. Dr. Blair has wisely referred to the importance of the psychology of these cases. Dr. Sabine's patient, overcome by chagrin, shot himself.

A PLEA FOR THE ONE STAGE OPERATION IN TOTAL LARYNGECTOMY WITH A DISCUSSION OF THE IMPORTANT POINTS IN ITS MANAGEMENT. Presented by DR. MACKENTY.

There is no logical reason for the multiple stage operation, according to the views of Dr. MacKenty. None of the disasters laid at the door of this operation have occurred in his experience. Not a single case of mediastinal infection, general infection or vagus block has occurred.

The important points to be stressed in the paper are:

1. Preliminary preparation of the case — metabolic, cardiac, alimentary and stomatic.

2. Anesthesia: Local for three-fourths of operation, and general for one-fourth.

3. Exclusion of blood from lung during and of wound drainage after operation.

4. Drainage: The method used is original and eminently effective, cutting off all the avenues of septic extension.

5. The correct management of the drainage following operation is paramount.

The after care requires more skill and experience than the operation, since conditions should not only be promptly met, but anticipated.

The one stage operation, as done by the author's method, obviates the future use of a tracheal cannula even if a tracheotomy has been performed before.

Slides were shown of parts of operative technic, particularly of those bearing on drainage and lung protection.

An artificial larynx was demonstrated on cases.

DISCUSSION

DR. DELAVAN: The points of interest to be discussed in connection with the demonstration just submitted are numerous. A number of years ago he called attention to the evil of indiscriminate operations on the larynx. Undoubtedly, some were successful and life was prolonged, but, estimating the duration of life in a case of laryngeal carcinoma to average about two years from the early appearance of the disease, it seemed probable at that time that, on the whole, the number of cases in which life had been actually shortened through the results of operation was in excess of those prolonged. Thirty years ago, in a symposium before the Laryngological Section of the British Medical Association in London, he strongly urged the following proposition, namely, that capital operations on the larynx were difficult and peculiar, and that they required special knowledge, skill and experience. The reason why little progress had been made up to that time was because every one and any one operated on anything that came his way. Patients were not properly selected, proper records were seldom kept, and the reports of unsuccessful cases were almost never published. Like other complicated and dangerous surgical operations, laryngectomy is no work for the tyro.

With regard to the apparatus for reproducing the voice; at the International Medical Congress, held at Buda Pesth in 1909, Professor Gluck presented a number of patients on whom he had performed complete laryngectomy, and showed a curious apparatus intended to provide tone. It was a small apparatus, somewhat resembling a miniature hand organ, with a crank which, on being turned, made an ineffective sound. It did not make a satisfactory impression. Dr. MacKenty modestly expresses the hope that his apparatus is but the beginning of something better, leaving room for improvement until something almost perfect is produced. The advance which he has made on the apparatus of Gluck proved that he has progressed many stages forward.

Until the prevention and cure of cancer by means other than surgery have been discovered, it would seem that this exhibition gives more confidence than anything we have ever had before.

DR. LEWIS: His experience, of course, did not compare with Dr. MacKenty's, and he followed practically his technic. He used rectal instead of local anesthesia, followed by chloroform. Rectal anesthesia, given by one who understood it and was experienced, makes the operation less troublesome to the operator.

DR. BLAIR: There is no place in surgery in which one is going to live or die by their technic as one does in laryngectomy.

As to the production of speech after a laryngectomy, he had seen instances in which it was just as loud as he was talking. If we could once teach the patients to give a prolonged noisy belch, the problem was solved; they would know how to speak.

DR. HURD: These patients do get well and do not have relapses as often as was formerly supposed. It was a question of technic, and he was still sticking to the two-stage operations. One thing he did want to speak about was the buccal voice. The fundamental point of the buccal voice was that a person has to learn to hold the diaphragm absolutely still while he talks. Unless they do that, they will not have an audible buccal voice. Teach them to hold their breath. They get so that they use the esophagus. One of the easiest ways was to get a person who smoked, put him at smoking and have him pull and fill the buccal and pharyngeal cavity as full as possible. Then

start him on the fundamentals — a, e, i, o, u — and he will get all the sounds but soft "h" and one or two that do not count. The greatest trouble comes from the question of age. The older patients are not willing to take up something new and learn it. They will not try.

DR. MACKENTY: The voice without the larynx, he thought, was produced by opening the esophagus. The patient shown takes a stomach full of air and utilizes it in talking it as he belches it up. When his stomach was full of food he could only count to ten, but when it was empty he could count to twenty on one inspiration.

LUNG ABSCESS, AN OCCASIONAL SEQUEL TO TONSILLECTOMY. Presented by DR. MCGINNIS.

Dr. McGinnis gave a historical review of the literature, from the two cases reported by Richardson of Washington in 1912, up to the present date.

He concluded that the consensus of opinion as to the etiology of lung abscess appears to be that infected material is aspirated into the depths of the air passages.

Davis and Pilot, in extensive studies of the cheesy masses from tonsillar crypts, tartar from the teeth, also discharge from chronically infected ethmoid cells, and lastly coughed up material from patients with lung abscess, found that mouth spirochetes and fusiform bacilli were present in large numbers. Koessler has confirmed this study.

This is essentially a mucous membrane involvement and follows the bronchial branches out to the air cells; there is very little destruction of lung tissue, hence no large cavity formation.

DISCUSSION

DR. SLUDER: The development of lung abscess after tonsillectomy was dependent to a great extent on the anesthetic. In St. Louis, they had used gas for a long time, since 1910. They could account for 20,000 out of 25,000 without lung abscess. Since that time two abscesses had developed, fortunately without fatal results. These operations had been done with the guillotine which permits rapid execution. The majority of them were done in twenty seconds. The gas anesthetic was short, consciousness returned quickly, which he believed was a definite factor in having so large a number as this with so few complications. No morphin was administered before hand. Dr. Loeb of St. Louis collected the statistics.

It was surprising to note the great number of lung abscesses that developed from all sorts of surgery in the upper respiratory tract. It was not limited at all to tonsillectomy, nor was it limited to any special technic. He remembered clearly that Dr. Coakley described a case as an example of perfect tonsillectomy under a local anesthetic, in which there was no possible aspiration and the patient developed a lung abscess. That raises the question, what is the route by which the infection travels? From Dr. Loeb's responses it would seem that certainly a great deal was carried by the blood stream and followed the local anesthetic. The insertion of the needle for the injection of the anesthetic in all probability carried the infection. The technic of the tonsillectomy apparently played no part.

DR. HURD: A short time ago, a man consulted him whose family doctor had told him that he had chronic bronchitis and was losing weight. He advised him to have his teeth cleaned and his tonsils out. Dr. Hurd gave him ether

and took out his tonsils. He saw him the second day after and the man complained of excessive expectoration. It was found that he had an abscess in the left upper lobe of the lung, which had been there for two months. The ether had made no difference to this patient. He was put to bed and in five weeks the abscess was well. The abscess cavity was 1½ inches in diameter of fluid level.

Dr. H. J. Lillie, Rochester, Minn.: The first he had seen of these abscesses happened when he was in service with Dr. Canfield, following an operation in which ether was used. Three days after operation (he was house officer), the patient suddenly complained of severe pains in the chest. Examination revealed typical findings from the stethoscope standpoint. The internist at that time confirmed the fluoroscope and roentgen-ray findings.

Clots in blood vessels have to organize and take care of themselves or they may get loose. So, with any type of surgery, in the throat or elsewhere, aspiration may play its part. Dr. Lillie was in accord with the opinions of Dr. Sluder.

Dr. Mullin: Dr. Lillienthal analyzed many cases; there was something extraordinary about the onset as it came between the eleventh and the thirteenth day.

Referring to the treatment, Dr. McGinnis spoke about artificial pneumothorax. If spontaneous evacuation does not occur with drainage and healing, then of course the abscess must be treated either surgically, if amenable to such by external drainage, or bronchoscopically.

Dr. Delavan: Until a few years ago he had never heard of lung abscess following a tonsillectomy. He never had one in his own practice and never heard of one in the practice of his instructors. Dr. Lefferts and Dr. Mackenzie, who removed more tonsils than any men of their time, never reported a case of abscess after tonsillectomy. The removal of tonsils in those days was not as thorough as it was now. A great many question arise apropos of this, and one question which occurred to him was whether it was necessary to use the measures that are used in modern times in all cases in which tonsils require removal. There are some tonsils which are easily removed by means of the guillotine. Some cases in the earlier days were done without any anesthesia. They did not use local anesthesia because they did not know there was such a thing. In modern times there is a change in conditions. There must be some explanation for this, some significance in the contrast between the results of the operation in that early period and the results of today.

Dr. MacKenty: In operations under anesthesia the patient was not given morphin, which he considered dangerous. The technic which he had used in operations aimed at avoidance of the entrance of any blood into the trachea at all. For that reason he used two suction apparatuses. One was held by the anesthetist who kept the blood from the posterior pharyngeal and hypopharyngeal wall at all times. The other suction was used by the assistant in the operative field. The area was thoroughly exposed and was kept exposed by the anesthetist holding down the tongue. One other point was that the patient was kept on the table until the reflexes were established. All secretions from the mouth and wound were sucked out so that nothing could get into the trachea until the patient was able to swallow. The patient was put to bed lying on the side, not on the back. Morphin was not used before operation.

Dr. G. M. Coates, Philadelphia: Not all the lung abscesses that developed were attributable to tonsillectomy. The only case he had seen was one done in another hospital, some two months before the patient came under his observation. The lung was satisfactorily drained externally and the patient made a good recovery until one year later when he developed another abscess in the lung of the opposite side without having had any operative interference in the meanwhile.

President Dean: Dr. Birkett has a few remarks to make.

Dr. H. S. Birkett, Montreal, Canada: With apologies for this interruption, a new committee has been appointed relative to the award of the de Roaldes prize. That committee, in order to carry out its terms of reference, wishes the Society as a whole to know just what they are, in order to lessen their labors and facilitate them in their work.

The terms of reference are: That the prize is open to all members of any laryngological or rhinological Society on this side of the Atlantic. It, therefore, becomes incumbent on this committee to review all papers participating in this particular line of work; as this would mean covering a large field, the assistance of the Fellows of this Association and the Associate Members would help us a very great deal. It is suggested that during your reading the coming winter, you make a note of any paper which is of sufficient merit to warrant it being brought to the attention of this Committee. Further, title of that paper, its author and in what publication it appears should be sent to Dr. Birkett. In this way the committee can assemble such material as will enable them to come to some decision concerning the award to be presented in the meeting of 1926. All the committee asks is for cooperation in this matter, thus facilitating its labors.

WEDNESDAY MORNING SESSION

Oblique Method of Roentgenography of the Paranasal Sinuses. Presented by Dr. W. P. Wherry, Omaha.

An elaboration of oblique roentgenography as applied to the paranasal sinuses, and summary of a study from dissected skulls, properly marked as to identification of interfering parts were given. The technic in question was proposed by Reese, and was suggested again by Iglauer and Van der Hoeve.

Incidentally, this was a criticism of the usual relation of the roentgenologist and those of us attempting diagnosis.

Certain of the skulls used in this study, as well as selected pictures to illustrate the points in question, were exhibited.

Dr. Wherry has had the collaboration of Dr. Overgaard, roentgenologist, and Dr. Hansen at the Anatomical Laboratory, University of Nebraska.

DISCUSSION

Dr. Mosher: The oblique position with the interpretation of the ethmoid and the sphenoid is of interest. The Waters position had been a favorite position to pick out the relation of the frontal to the postfrontal ethmoidal cells, feeling that many of the failures in the operation on the frontal sinus had been due to nonprotection of frontal and ethmoidal cells in series with the frontal sinus. The Waters position for interpretation of the antrum was not depended on. A full front view was taken.

The question of stereoscopic plates came up recently at the Medical School, and the roentgen-ray man was asked to speak to the point. He said that the stereoscopic plate in the interpretation of pathologic changes was not good.

DR. SKILLERN: This method, except perhaps in those cases in which the liaison between the roentgen-ray man and the roentgenologist was possible, would not be of much assistance, and he doubted whether it would be popular.

LARYNGEAL STENOSIS IN LARYNGEAL TUBERCULOSIS. Presented by DR. FRANK L. DENNIS, Colorado Springs.

Laryngeal obstruction of the larynx may arise from blocking of the glottis by tuberculoma; widespread and massive infiltration and edema; amyloid disease; paralysis of the abductors and ankylosis of the crico-arytenoid articulation or from scar formation.

Typical cases of these conditions were quoted from the literature. Symptoms and progress of the disease: infiltration and ulceration, followed by increasing dyspnea and suffocating attacks. Stenosis frequently occurs in long standing cases of tuberculosis but may occur early. Posticus paralysis is often associated with ankylosis of the crico-arytenoid articulation. Amyloid disease, resulting in obstruction is rare, and in his experience of one case was part of a generalized amyloid degeneration. Stenosis from web formation is also a rare form in tuberculosis, though frequent in syphilis, and is always a sequel of long standing lesion. The development of the web proceeds slowly and is part of the reparative process, analogous to fibrosis in lung tuberculosis. The location of the web was referred to, also adhesions between the vocal bands. The treatment varies according to the nature and location of the obstruction, vital indications and the stage of the tuberculous process. Paralytic patients often need tracheotomy early as a life saving measure. Direct surgery of the tubercular lesion may excite renewed activity in the lung or larynx if done too early. Intralaryngeal removal of the obstruction, laryngofissure or laryngectomy were recommended. Removal of scar and dilatation by O'Dwyer's tubes, Shrotter's bougies or doubled soft rubber tubes, were suggested.

The author presented patients, and showed lantern slides.

DISCUSSION

DR. G. FETTEROLF, Philadelphia: He had had five of these cases, one of which should be put on record because of a very interesting factor connected with it.

This man he first saw eighteen years ago at a sanitarium in White Haven. His attention was called to him because of obstructive dyspnea. Examination showed a condition in the larynx similar to the one Dr. Dennis showed in Figure 2, that is, decided adduction of the cords, with a broad papillomatous projection from the posterior wall, some thickening of the arytenoid cartilages and some roughness of the cords. He was taken to Philadelphia and a low tracheotomy was done. The breathing was, of course, immediately relieved. He was an intelligent man, a priest, and his cooperation straight through was most valuable.

In the attempt to cure the tuberculous disease of the larynx, the papillomatous growth was removed first. It proved to be a simple papilloma, a nontuberculous hyperplasia. Then the arytenoids were cauterized, which

caused them to shrink to normal size. All the granulations on the cords then disappeared and the latter became smooth. The patient was able to use his voice if he took a lung full of air and put his finger on the tracheotomy tube. The thought occurred that a valve could be put on the tracheotomy tube which would open during inspiration and close during expiration. A ball valve arrangement was made and hooked on to the tracheotomy tube by a bayonet catch. The valve consisted of a hollow steel ball which would close the opening during expiration and pull up and open during inspiration. The patient found he did not like this very well for two reasons: The steel ball was rather heavy and required distinct muscular effort to fill the lungs, then too there was a distinct audible click and at each breath people nearby would look around to find from where the click came.

In place of the steel ball a cork ball was tried, with a couple of wires behind the ball to keep it from going down the tracheotomy tube and into the trachea. This arrangement has continued in use for years with great comfort, and the man is now able to fulfil all the functions of a priest, including preaching in a large church and intoning services.

Dr. J. M. Hall, New York: Although just a visitor, he was much interested in the value of the tracheotomy tube with a valve in it. He was using one that was working quite successfully at the present time.

Dr. Mullin: The problem confronting one in dealing with this condition was that one hardly realized how slowly everything develops in tuberculosis. The development of this condition in the larynx comes on so very slowly. One hesitated to advise tracheotomy because after the tracheotomy was done, one could not offer the patient a quick means of getting rid of the tube. It is difficult to obtain consent for a tracheotomy until some embarrassment had developed.

Vaccines from Hemolitic Cocci in Spheno-Ethmoidal Disease. Presented by Dr. Fenton.

The history of vaccines was given as follows: Vaccines in rhinology, their preparation and clinical effects. Autogenous versus stock vaccines. Monovalent versus polyvalent vaccines. Theory of alien-protein therapy; diphtheria antitoxin; milk injections; typhoid serum. Improvement in bacteriologic and serologic technic during thirty years. Infestation of population with streptococci during influenza epidemics. Change of bacterial flora.

Obstinate cases of spheno-ethmoidal disease for which local remedies and procedure are inadequate: asthmatoid types; sphenopalatine neuralgias; recurrent symptoms after complete operations; inoperable cases (cardiac, renal, hemophilic and tubercular). Infrequency of free pus. Inaccuracy of roentgenograms. Distant complications of such focal infection.

Methods of bacterial culture: Mixed flora from swab methods; the West tube; loop culture from behind and above middle turbinates; use of blood containing mediums.

Frequency of hemolytic organisms in class of cases mentioned: Meaning of hemolysis; two types; an index of virulence and a criterion of general damage to the individual.

Vaccines from hemolytic organisms: Dosage; length of administrations; reactions; necessity for renewed cultures at intervals.

Tables of case reports: Summaries of percentages and control cases with use of alien protein were reported.

Conclusions: 1. Results of stock vaccine injections are dependent on alien protein reaction; this is dangerous, because the dosage is large and the effect dubious.

2. Results of autogenous vaccines from hemolytic organisms are highly successful in obstinate spheno-ethmoidal cases. This is not a substitute for surgery, but an adjuvant thereto.

DISCUSSION

Dr. Skillern: He has been using, as everybody has, for perhaps a decade, the long platinum loop on a glass rod. First of all, it is introduced in the sphenoid without cleansing. Then the nose was wiped out. Suction was applied, and again a culture was taken of the spheno-ethmoidal region. It is interesting to note the differences which the culture brought out between the time of the investigation before the washing and after the suction.

In his judgment, Dr. Fenton has shown by his infinite capacity for taking pains, the genius that he was; if his results are corroborated by future observations (which there is every reason to believe that they will be) he will indeed have conferred a boon on humanity and given his colleagues a new lease on life, and incidentally gone a long way toward solving the so-called ethmoidal problems.

Dr. Coates: The vaccine therapy, a chance to cure these cases of this condition that have defied every other treatment, offered us an alluring field to work in. Our main trouble in the past had been to isolate the true infective agent in each case. We had tried various methods of skin reactions with rather indifferent success. If it could be assumed then that the majority of these cases were caused by hemolytic organisms and that the vaccines made from these hemolytic organisms offered a better chance for cure, we have gone a long way toward solving the problem of what strain or organism to use.

Dr. Sluder: He had repeatedly tried vaccines. Incidentally, many of the efforts were failures. He was going to try over again and see if he could not help some of the patients who suffer such agony.